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THE FOUNDRY

Vol. 20. *CLEVELAND, OHIO, MARCH, 1902.* *No. 115.*

PUBLISHED MONTHLY BY
THE IRON AND STEEL PRESS CO.
ROSE BLDG., CLEVELAND, OHIO.

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CHICAGO: 984 Monadnock Blk., GEO. H. GRIFFITHS.
PITTSBURG: 429 Park Bldg., A. O. BACKERT.
NEW YORK: 150 Nassau St., D. C. WARREN.

The subscription price of THE FOUNDRY is $1.00 a year to points in the United States, Canada and Mexico. $1.75 to all other countries.

Practical articles pertaining to the trade in all its branches are solicited and will be paid for.

We can begin subscriptions with the current number only.

Entered as second-class matter at the Post-Office at Cleveland, Ohio.

Trade Outlook.

That portion of our reading columns given over to the recording of news from among the foundries continues to be well filled and is of itself an indication that there is something doing in the ranks of the makers of castings. New shops are being planned in all branches of the trade and the majority of foundries have found themselves so well supplied with orders that the time usually allowed for stock-taking has been reduced to the shortest period possible. The least activity is probably to be found among the stove foundries, which are more than likely to make a small advance in the price of their product owing to the higher values demanded for raw material. The supply of molders is in about the same condition as the supply of pig iron, there is a general scarcity, with first-class machinery molders commanding a premium.

There is no doubt that many of the smaller foundries will find it extremely difficult to secure sufficient iron to cover their needs, and the same will hold good with some of the larger concerns who have neglected to contract for their full requirements. Touching upon general conditions in the trade, Rogers, Brown & Co., say in a recent market review:

The continuance of the animation of the general pig iron market should perhaps cease to excite wonderment as the activity has been so protracted that recent and existing conditions have come to seem normal. The demand for pig iron is well sustained, and while the orders seem to aggregate an inordinate tonnage, giving rise to suspicions that some purchases are of a speculative character, the buyers are all consumers and represent that they are providing for known requirements and covering simply for reasonably expected future necessities. A majority of the large consumers have bought to July 1st: some have covered to September 1st and a very few for the entire year, but the majority in number will require a great deal of iron between this and July 1st and all the small buyers who purchase from month to month will have to be supplied from some source or discontinue.

The conditions are peculiar—orders have been going abroad for steel rails, billets and irons for steel making. The Pacific Coast foundries are buying foreign pig iron quite liberally because cheaper than the domestic, and Nova Scotia is finding customers in New England.

Notwithstanding these outside supplies, the furnaces of the United States are unable to adequately meet domestic demands. Virginia shipping Basic iron into Missouri and Northern Illinois, further illustrates the peculiar conditions prevailing.

Each week enables makers of raw and finished iron to see their way more clearly to the end of 1902. Nearly all the business now doing is for the summer deliveries and later. Indeed, there is scarcely a blast furnace, steel rail mill, structural mill, bridge works, car works or locomotive works that can talk of anything earlier. There continues to be a persistent effort by manufacturers to hold prices level, and thus prolong indefinitely the great demand.

The question is daily heard, "How long is this demand going to keep up?" The answer is, "What is going to stop it?" All admit that it must slacken some day, and bring new con-

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ditions into the trade. But no one seems able to discern any sign of a let up, or name any good reason why a halt should come within one or two years.

Certainly prices of pig iron are not high enough to influence any one desiring to use it. They are 33 per cent lower than two years ago, and, considering cost of labor, ores and coke are scarcely better for the furnaces than in the lean years. The small rise of $2 a ton that has taken place since last summer but little more than covers the rise in cost for the furnaces that buy their materials.

Gas as a Fuel for Brass Furnaces and Its Effect upon Crucibles.

Referring to an item on this subject appearing in our February issue, the Brass Founders' Supply Co., of Newark, N. J., say: Natural and manufactured gas are both hard on crucibles, generally making this fuel more expensive than coal or coke. In using anthracite coal or coke a forced draft is sometimes employed, though a natural draft will be found much easier on crucibles. All gas burning furnaces use a blast. We have taken out expensive gas burning plants and installed our old-fashioned coal or coke burning furnaces instead.

The McCullough-Dalzell Crucible Co., of Pittsburg, give their opinion as follows: We have had considerable experience with concerns using oil and gas for a fuel for melting brass, to such an extent, in fact, that we now make a special crucible for gas and oil furnaces. Those using gas or oil claim that the cost of melting is cheaper and that less time is consumed and that the heat is better regulated than with coke, although it is harder on the crucible. Steel manufacturers use gas almost exclusively. We believe that were the heat properly applied, so that a cutting flame is not thrown against the crucible, if the proper amount of air, and *not too much*, is used with the gas or oil and where the crucible is made for the purpose, that oil or gas can be used advantageously. In other words, with a proper burner, furnace and crucible, gas or oil as a fuel will work satisfactorily.

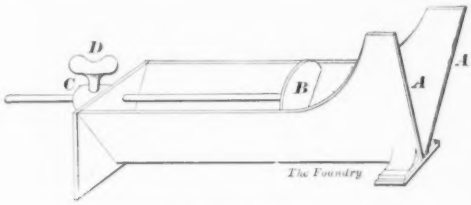
The Taunton Crucible Co., of Taunton, Mass., write: Gas of any kind and oil are very hard on crucibles for the reason that furnaces utilizing these fuels are usually operated with forced draft, which plays on particular points of the crucible and burns out the plumbago, leaving only a clay body in those spots; especially is this so if the plumbago is not of the best quality. Coal is the most favorable fuel, for its gases create in two or three heats a hard glaze over the entire outside of the crucible, and after this takes place the heat of the fuel wears away the surface very slowly. Where gas or oil is employed this glaze is entirely absent and the surface of the crucible is soft, whereas with coal it is hard and therefore possesses greater heat resistance. Many brass founders fail to realize that plumbago or black lead of carbon, as pure as 98 per cent, burns, but once afire it burns of itself, until exhausted. The use of coke is also very hard on crucibles, for the reason that no scale forms, as there are no gases. As a general rule brass founders aim to do quick melting, and when it comes to determine which is the cheapest fuel, all things have to be taken into consideration, and experience alone will demonstrate which fuel shows the greatest economy. Where records are shown of crucibles having withstood a large number of heats it is safe to assume that the fuel has been coal.

Another crucible manufacturer who has had many years of experience in furnishing crucibles to be used under all kinds of conditions, says: The difficulty in using oil as a fuel for brass melting furnaces is that, graphite being a form of carbon, is easily attacked by air. With oil as a fuel air is necessary to have proper combustion and where more of this is admitted than is actually required to induce perfect combustion, it attacks the carbon in the form of graphite, and thus consumes it, as there is not sufficient carbon in the oil fuel. Where an insufficient amount of air is being admitted for proper combustion, the heat is not sufficiently intense to melt the brass. After one or two heats the crucible should glaze over, thus protecting the carbon in the crucible, but the danger occurs in these first few heats.

A manufacturer of gas furnaces says: While we have built many furnaces which operate satisfactorily, we are making no efforts to reach the brass foundries. It has been our experience that there is no class of mechanics so set in their notions and so opposed to innovations as the brass founders, and we consider the difficulties attending the introduction of gas furnaces to this branch of the foundry trade too great and time consuming. The destruction of crucibles complained of by users of gas furnaces arises through an imperfect mixture of gas and air, and the use of cheap gas.

A Core Gage.

The sketch shown is not a new fangled patent hog trough, but an article I once saw reposing on the bench in the core room of one of the foundries in Providence, R. I. It is a combined gage and holder for cores when squaring them off to a given length. I understood it had been there for a good many years, so it is not new, to say the least, but at the same time it may be new to some, for oftentimes a thing may be common enough in a given locality, and entirely unheard of in some other place.



A CORE GAGE.

The rod in gage B slides back and forth through the hub C and is held by the thumbnut D, thus accommodating different lengths of cores, which are cut off by using a piece of an old buck saw blade, held against the edges AA.

There are doubtless many devices for cutting off cores, and I simply mention this as being one that happened to come under my notice.

JOHN M. RICHARDSON.

Methods of Analysis for Cast Iron.

The American Foundrymen's Association committee on standardizing bureau has sent out the following circular letter to manufacturers and users of pig iron maintaining their own laboratory:

"Pursuant to instructions received at the Buffalo convention of this Association, careful inquiry has been made as to the feasibility of recommending given methods for determining the constituents of cast iron as the standards of the association. The concensus of opinion seems to be that such a standardization is a highly desirable one, but that no one method be selected. All those methods giving concordant results within the limits of commercial accuracy should be allowable. The committee would therefore request your laboratory to send to Thos. D. West, chairman, Sharpsville, Pa., any method for the determination of the total carbon, graphite, silicon, manganese, phosphorus and sulphur in cast iron, which it would recommend for adoption as standard. The literature thus received will be reviewed by chemists of national repute, and all methods known to give commercially accurate results selected for recommendation as standards. Should it be possible to secure such a selection, a great boon will be conferred upon foundry, blast furnace, and laboratory management alike, and your kindly attention and aid are therefore urgently requested."

Some Chicago Claims.

We have previously referred to Chicago as containing within her borders more iron foundries than any other city in the world, and in reviewing her resources the newspapers of the Windy City claim a few other laurels for their town.

The McCormick Harvesting Machine Works, which in 1901 produced 360,000 machines, is one of Chicago's world-beaters. Its foundries are given credit for melting 280 tons of gray iron daily. In the line of stoves the *Inter Ocean* says that more stoves are sold in Chicago in six hours than are sold in any other city in the world in six days. It is not generally known that the stove trade in Chicago is proportionately greater than the packing industry. Chicago has led the stove market for many years, and has increased the lead this year. The volume of business for 1901 exceeded that of 1892, the banner year in the history of the trade, and compared with 1900 gained fully 25 per cent, and sales $9,000,000, and for the country at large $42,000,000. Prices were maintained, and factories have been running with three shifts of men to supply the demand of the last three months. In spite of the great increase in the sale of furnaces and steam and hot water heating plants, the sales of heating stoves have not suffered. Hard-coal burners have been in especial demand, and expensive steel ranges have sold as never before. The demand from the country at large is responsible for the activity in heaters and ranges. In the city they have suffered somewhat from the inroads of the furnace, heating plants, and gas ranges, but the increased demand outside has more than made up the difference.

Under the name of the Lancaster Castings Company the Bellwood Mfg. Co., of Bellwood, Pa., will operate a foundry at Lancaster, Pa., in order to more promptly supply its Eastern trade. The new plant is expected to cost $75,000.

PLANT OF THE MESTA MACHINE CO., WEST HOMESTEAD, PA.

The Mesta Machine Co.'s Works.

One of the largest foundries in the United States, capable of making the heaviest class of castings in steel, as well as in iron, and one of the best equipped shops in existence, is that of the Mesta Machine Co., at West Homestead, Pa., a suburb of Pittsburg. This company was chartered under the laws of Pennsylvania in November, 1898, and is a consolidation of the Robinson-Rea Mfg. Co., whose works were located on the South Side, Pittsburg, and the Leechburg Foundry & Machine Co., with works at Leechburg, Pa. The officers of the company are: George Mesta, president; J. O. Horning, secretary; W. H. Rea, treasurer, and W. D. Rowan, auditor. The company began the erection of new works in November, 1898, on a ten-acre piece of ground located on the Monongahela river, about six miles above Pittsburg and one mile below Homestead. The property is situated between the Pennsylvania railroad and the Pittsburg, McKeesport & Youghiogheny railroad, and also has direct connection with the B. & O. railroad. The company also owns 200 ft. of river frontage, which gives it direct connection with three leading railroads and the Monongahela river.

The buildings, which are 820 ft. long and 210 ft. wide, are entirely fire proof, being constructed of structural steel and fire brick. The framework alone in the building contains over 2,000 tons of structural steel. The foundations for the heavy columns, which support the crane girders, are built of concrete and hard-burned brick; the crane girders, columns and foundations being designed to carry cranes with 100 tons capacity.

The plant has the largest output of rolling machinery of any individual rolling mill machinery plant in the world. Its roll department is first in output and it has the distinction of being the only roll foundry manufacturing sand, steel and chilled rolls. It is also unique in being the only plant in the country manufacturing machine-molded steel gears.

When the works were built they were laid out with a view of incorporating a modern blowing engine erecting department; and being the last plant of its kind erected it has incorporated all late devices. At the present time it is the only plant in the Pittsburg district making Corliss blowing engines. The company also manufactures all kinds of heavy rolling mill machinery, such as blooming mills, slabbing mills, bar mills, shears, roll lathes,

WORKS OF THE MESTA MACHINE CO., WEST HOMESTEAD, PA.

PLANT OF THE MESTA MACHINE CO., WEST HOMESTEAD, PA.

METAL YARD OF THE MESTA MACHINE CO., WEST HOMESTEAD, PA.

etc., sand, chilled and steel rolls; machine molded gears made of steel or iron, steel castings, besides engines of various types.

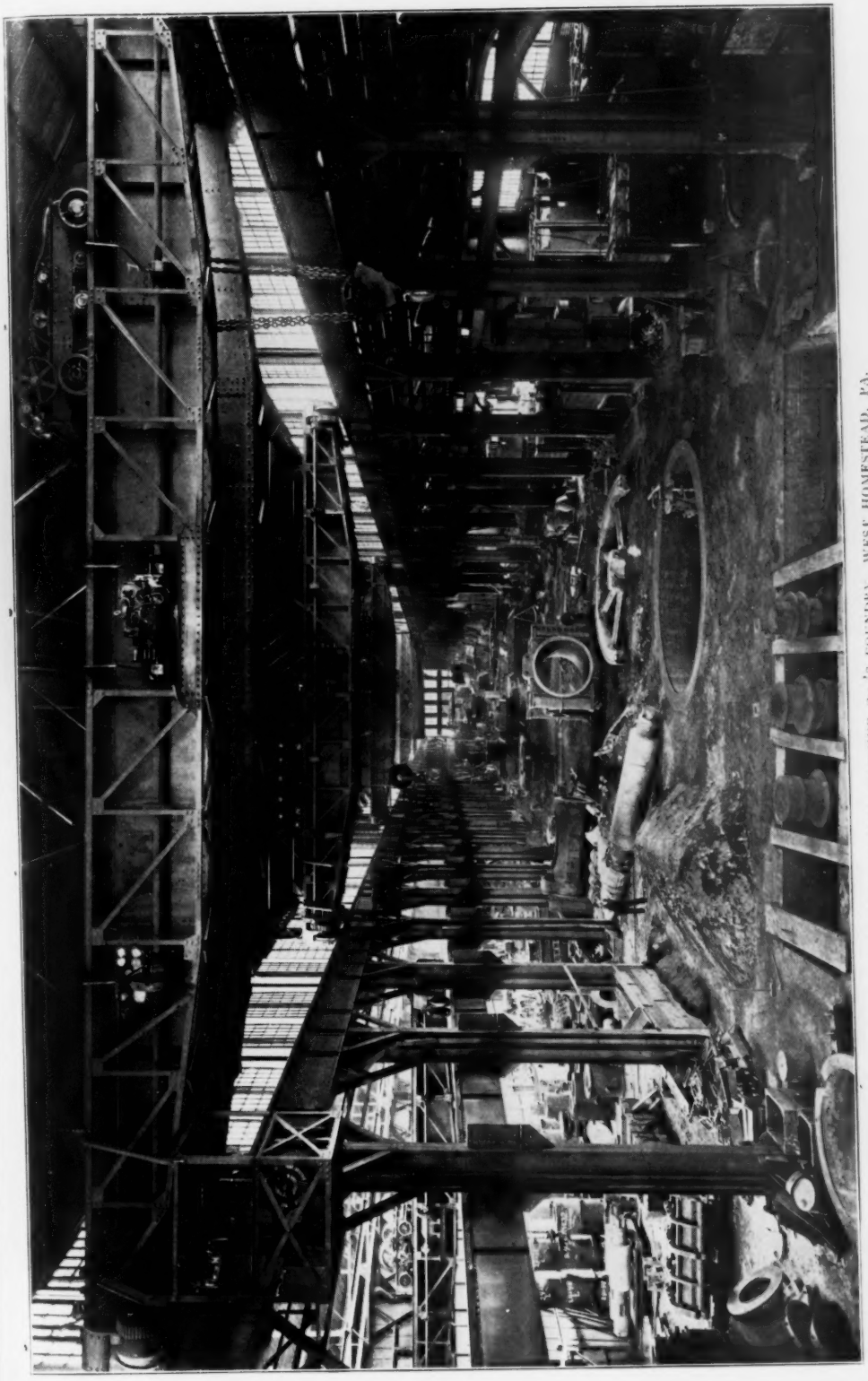
METAL YARD.

The metal yard is 50 feet wide by 820 feet long, covered by a 15-ton overhead electric traveling crane. All material coming into this yard is weighed on a 100-ton track scale, and then unloaded by means of the crane. This crane is also used for charging the metal and heavy scrap into the furnaces. There is also located in about the center of the yard, the chemical and physical laboratory, where all raw materials are tested before they are used. Chemical and physical tests are also here made of each heat, both iron and steel.

FOUNDRY DEPARTMENT.

The foundry department is comprised in a building 125 feet wide by 820 feet long, in which are nine overhead traveling cranes, ranging in capacity from 10 tons to 50 tons. The roll foundry occupies a space of 125 feet wide by 180 feet long, and contains two 15-ton air furnaces and two 18-ton air furnaces, in which all iron is melted for making rolls. These furnaces are charged by electric traveling crane direct from the metal yard, and are furnished with coal from one central coal storage, by means of electric overhead conveyor. This department contains a 10-ton electric crane over the side floor and 30- and 50-ton cranes over the main floor. There are also several large casting pits, which permit of making the largest rolls used.

The green and dry sand foundry occupies a space of 210 feet in width by 280 feet in length, and contains two 30-ton air furnaces, one 72-inch cupola and one 84-inch cupola; also necessary drying ovens, core ovens, etc. This department contains overhead traveling cranes, ranging in capacity from 10 to 50 tons. All of the important castings, such as Corliss cylinders, engine bed plates, housings, etc., are cast from the air furnaces. The two 30-ton furnaces are so arranged that they can be tapped into one ladle. In this way they are able to cast a 60-ton casting of air furnace iron. At the lower end of this department is the loam molding department where all cylinders and



INTERIOR VIEW, MESTA MACHINE CO.'S FOUNDRY, WEST HOMESTEAD, PA.

that class of work are cast. Just opposite this department is a large casting pit, which is of sufficient size to cast a Corliss cylinder 108 inches in diameter.

GEAR FOUNDRY.

The gear molding department is located between the iron foundry and steel foundry, thus permitting of filling the molds with either iron or steel, as may be required. This department contains three patent gear molding machines, which are operated similarly to the Groves, the O'Neil (illustrated in our Jan. issue), and the gear molding machines in use by The National Gear Wheel and Foundry Co., of Allegheny, Pa. On these machines the flask in which the mold is to be made is revolving on a table, while the pattern, carried on an overhead support, remains stationary. By this method a gear with a large or small face, or with a large or small diameter, can be made with equal accuracy. The gears and the dividing mechanism of the Mesta machines are made partly by the Gleason Tool Co. and partly by Brown & Sharpe, and gears made on these machines are guaranteed to be absolutely accurate.

STEEL FOUNDRY.

The steel foundry occupies a space of 125 by 280 feet, and contains four overhead electric traveling cranes, and one 25-ton and one 30-ton acid open hearth steel furnace; also the necessary drying ovens, and an annealing oven, which has sufficient capacity to anneal the largest sized casting. One of our illustrations shows the annealing furnace with a 50,000-pound steel casting just brought from the oven. A point of special interest is the carriages for these ovens and the ball-bearing V grooved tracks on which they travel. It would seem as if this kind of an arrangement could be used with advantage for ovens intended for drying very heavy molds and cores as well as for annealing ovens. Natural gas is used for fuel in this furnace, and castings as large as 50,000 pounds can be brought up to a bright cherry red, which is necessary to thoroughly anneal them. The company makes a specialty of high grade steel castings, such as engine shafts and cranks, housings, rolls, etc., and use only low phosphorus and low sulphur stock, in their open hearth furnace. Opening from the steel foundry is a building 40 by 280 feet for cleaning the castings, also containing cold saws and other machinery for cutting off sink heads.

EQUIPMENT.

The plant contains 20 overhead electric traveling cranes, ranging in capacity from 5 to 50 tons. These were designed by the Wellman-Seaver Engineering Co., of Cleveland, and all excepting two were built in the company's own shops.

The power plant is located in the center of the buildings and consists of two 300-horsepower Cahall boilers, two 300-horsepower engines (each being direct connected to a 200-kilowatt Westinghouse generator); also a 150-horsepower Westinghouse gas engine, and an 85-kilowatt Westinghouse generator. The current from all the generators is taken into one switchboard and from there the power is distributed to all parts of the shop by underground wires laid in conduits. All cranes and other machinery are driven by Westinghouse motors, the entire plant being operated by electric power.

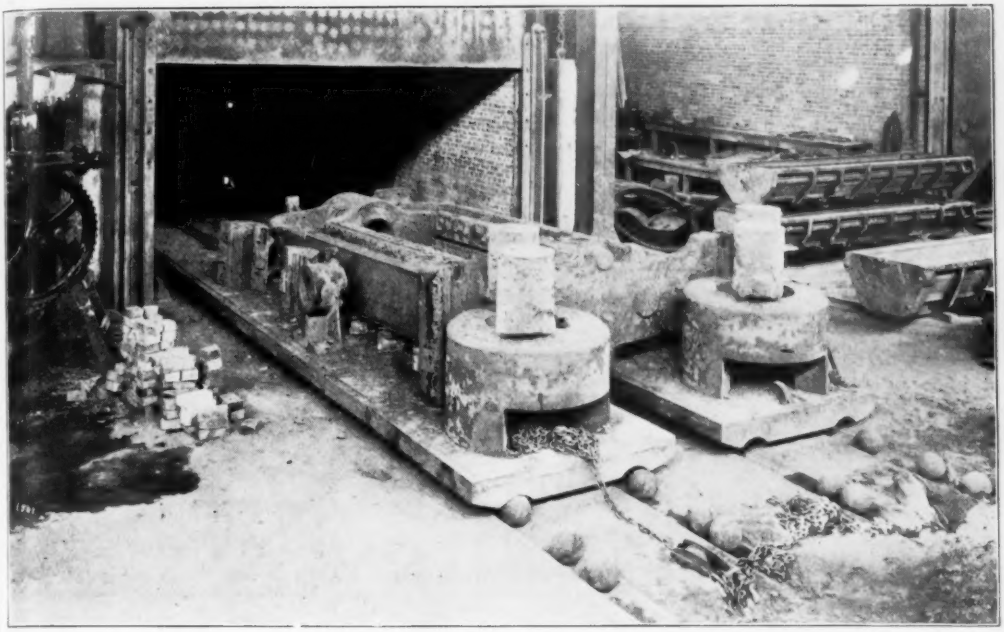
PATTERN DEPARTMENT.

The pattern department is located about 50 feet from the upper end of the foundry department, and consists of a building 50 by 100 feet, two stories high, with a wing 25 by 50 feet, two stories high. The two floors in the main building are used for pattern making. The top floor of the wing, which connects the foundry to the pattern shop is used for storing patterns which are ready for the foundry. There is also a platform in the foundry building upon which the patterns can be placed so that they can be reached with the traveling cranes. The first floor of the 25 by 50 foot building is used for a carpenter shop.

The office building is located about 50 feet from the main buildings and is 45 feet wide by 90 feet long, three stories high, and is of strictly fire proof construction. The first floor contains time office, kitchen, dining room and reading room. The second floor contains the general offices. The third floor contains draughting room and engineers' offices.

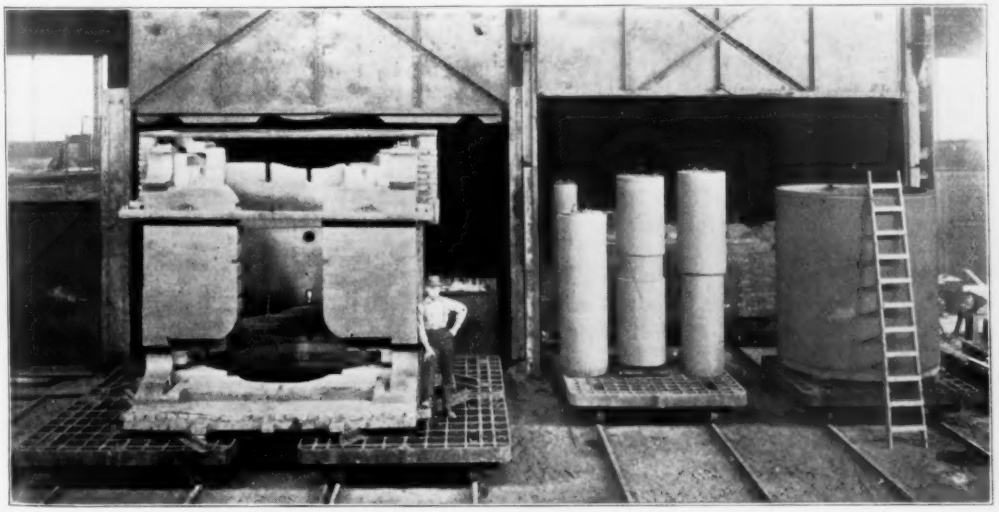
SHIPPING FACILITIES AND GENERAL ARRANGEMENT.

The shipping facilities are the best obtainable, the plant being located on four railroads and the Monongahela river. The general arrangement of the plant with reference to bringing material in and shipping the finished product differs materially from that in shops designed heretofore. Instead of the tracks entering the building parallel to the travel of the overhead traveling cranes, the plant is so arranged that three railroad tracks enter the shop at right angles to the travel of the cranes. This method has two advantages over others: First the tracks take up much less room in



ANNEALING FURNACE IN FOUNDRY OF THE MESTA MACHINE CO., WEST HOMESTEAD, PA.
CARRIAGES WITH A 50,000 POUND STEEL CASTING.

running across the shop than throughout its entire length; second, the three tracks divide the shop into four equal parts. Therefore the material is not carried any great distance to reach the tracks on the car. This arrangement divides the different classes of work in the shop into distinct sections. In the roll department, for example, all the raw material used in making the rolls is brought into one end of the stock yard. The roll molding and casting department is located in an adjoining building and the roll turning department also adjoins this. Thus the roll department can be operated almost as one individual plant, being divided by the railroad tracks from the other departments. This same arrangement is carried out in the other departments of the plant. To facilitate the shifting of cars in and out the company owns a small shifting locomotive. It is not only used in hauling material to and from the plant, but also in conveying castings from one part of the shop to another.



TWO OF THE CORE OVENS AT THE MESTA MACHINE CO.'S FOUNDRY, WEST HOMESTEAD, PA.
CARS LOADED WITH MOLD AND CORES FOR AN 84″ x 66″ CORLISS CYLINDER.

CAST IRON NOTES.

Devoted to inquiries from Practical Foundrymen on the subject of Melting and Using Cast Iron. Address all inquiries to W. J. KEEP, care of The Foundry.

WHAT IS THE BEST MIXTURE?

We send you analysis of the different irons in our yard, with the price per ton:

Judging from the analysis and price, what would you recommend to produce the best results for softness and strength?

		Price Shillings	T. C.	G. C.	Comb. C.	Sil.	Phos.	Sul.	Mn.	
7	No. 1 Carron	75/-	3.64	3.50	.14	2.80	.87	.04	1.45	Scotch
8	No. 1 Thornsby	71/-	4.03	3.90	.13	2.50	.05	.03	1.07	Hematite
5	No. 1 Barrow.....	69/-	3.36	3.04	.32	2.40	.06	.06	.41	Hematite
3	No. 1 Sheepbridge ..	58/-3	3.90	3.80	.10	3.40	1.45	tr.	.98	
6	No. 1 Red Car	54/-9	3.88	3.33	.55	1.75	1.55	.08	.78	
4	No. 1 Cargo Fleet...	54/-6	3.64	2.98	.66	3.44	1.60	.04	.69	
1	No. 1 Ormesby	54/-6	3.24	3.08	.16	3.34	1.46	.04	.79	
2	No. 3 Cargo Fleet...	53/-9	3.68	3.55	.13	2.54	1.55	.02	.66	

We enclose our record for two days with ½-inch square test bar:

(1) Dec. 5, 1901, strength 422 lbs., deflection 1.151 inch, Si. 2.50; mixture 2 cwt. each Redcar, Thornsby, Ormsby, Barrow and 3 cwt. scrap.

(2) Dec. 11, 1901, strength 407 lbs.; deflection 1.156 inch, Si. 2.60; mixture 2 cwt. each Redcar, Sheepsbridge, Carron, Barrow and 6 cwt. scrap. Machinability medium in each case.

I would suggest:

(3) 3 cwt. Ormsby, 2 cwt. No. 3 Cargo Fleet, 2 cwt. Sheepsbridge, 1 cwt. No. 1 Cargo Fleet, Si. 3.17, or

(4) 3 cwt. Ormsby, 2 cwt. No. 1 Cargo Fleet, 2 cwt. Sheepsbridge, 1 cwt. No. 3 Cargo Fleet. Si. 3.28.

In making your tests you have left out the most important part, viz., the shrinkage and chill of your casting.

The shrinkage would show the influence exerted by the silicon in your casting, and whether it would be best to increase or decrease the silicon.

The depth of chill and amount of shrinkage show relative hardness.

The least chill and lowest shrinkage give the softest castings.

I cannot see any reason for using those high priced irons, though we in America favor hematite irons for foundry work, and have pleasant memories of Scotch irons that we formerly used.

If chemical analysis is a sure guide the irons are desirable in the order marked in the left hand margin. If for any reason they vary from this, the measure of shrinkage and chill would tell you at once which is best. This measure of shrinkage and chill is a mechanical analysis of the influence of silicon, in presence of all other chemical elements and of all conditions which in the blast furnace or cupola influenced the physical quality of the iron. Low combined carbon in the pig shows favorable furnace conditions. High silicon should produce low combined carbon if all other conditions are the same.

Redcar has the highest sulphur of any, yet has high total carbon, and considering the very low silicon its combined carbon is very low.

For your spinning machinery castings you ought to have over 3 per cent of silicon, with low manganese, sulphur and combined carbon.

Your mixture (1) contains .78 per cent and (2) .98 per cent of phosphorus. The mixtures (3) and (4) would contain 1.50 per cent. Phosphorus should never be over 1.00 per cent, as strength decreases very rapidly with any further increase.

If you find that the strength runs below 400 lbs. by using the cheap irons, cannot you find an iron lower in phosphorus with other elements like the irons 1, 2 or 3. Strength you will find, does not depend in any great degree upon chemical composition, but on the form and size of the grain of the casting, and while phosphorus, if over 1 per cent, does produce a shape of grain that decreases strength, yet I venture to say that a mixture of the irons which you have, with phosphorus over 1 per cent, can be made which will give 400 lbs. in the ½-inch square test bar.

If I were in your place I would keep on hand some good ferro-silicon, so that you

could add a little when your iron needed softening.

The form of cupola has very little influence on the hardness of cast iron, but the first iron that is melted is much harder than that which is melted after the cupola is hot.

HOW CAN WE SOFTEN OUR IRON?

With the above English letter comes one from Belgium, asking, "Could you give us a method for rendering our iron softer? We use a mixture as shown in above table.

	T. C.	G. C.	Cd. C.	Sil.	P.	S.	Mn.
45% Skillinggrove (English)	2.99	2.75	.24	2.89	1.29	.04	.55
15% Halanzy (Belgian)	3.30	3.00	.30	2.86	1.43	.02	.64
5% Cockerill Hematite Belgian	3.65	3.00	.65	2.91	.04	.01	1.65
30% Good Machinery Scrap and return							
5% Iron and Bessemer turnings							
The casting analysis is	3.35	3.00	.35	2.25	1.38	.06	.62

We believe the hardness of our castings comes from the phosphorus, but iron with less costs too much."

Reducing the phosphorus would not soften very much. The Skillingrove is too low in total carbon if the analysis is correct. You should never use any iron with less than 3.25 per cent, and the more the better. Keep the manganese as low as possible. If you could raise the silicon to 2.75 per cent it would give you soft castings. If you are using wrought or steel turnings and will leave them out you will get softer castings.

Measure the influence of silicon by the shrinkage of a test bar ½-inch square and you can tell whether any change that you make is an improvement. First measure the shrinkage of your iron as you have it. Also measure chill.

WHAT IS MECHANICAL ANALYSIS?

Primarily it consists in measuring the shrinkage of a test bar made from iron when it is perfectly satisfactory, which is the *standard* for that class of castings.

The shrinkage of a test bar must be kept as nearly uniform as possible each day, which insures a uniform quality of castings.

If shrinkage increases, silicon must be increased by using more soft iron, if it decreases use more scrap or cheaper pig iron.

This simple process, occupying five minutes of the superintendent's time and costing three cents for test bars, controls a foundry mixture absolutely, is the only practical method, and *can be used by anyone*. It accomplishes more than chemical analysis in the most expert hands.

If desired, strength, depth of chill, etc., can be determined, and the following is true:

With high shrinkage and high strength of a ½" square test bar, heavy castings will be strong, but castings ⅛" thick may be brittle.

With low shrinkage and high strength, large castings will be weak and thin castings will be strong.

With uniform shrinkage an increase in the strength of a ½" square test bar will increase the strength of all castings proportionately.

For ordinary foundry work, and for all irons that will run gray in a ½" test bar, that size gives better results than any other.

Mixing Iron by Analysis.

In the February issue of THE FOUNDRY there appears a mild criticism of my paper on this subject, which appeared in the November FOUNDRY. The purpose of my original article was not to teach how to mix iron by chemical analysis, but to try and get the foundrymen to do so, and to some extent assist in distributing knowledge with that object in view, and to assist those of us who mix iron by analysis in obtaining more correct determinations from the furnaces and ovens, without putting us to the extra cost and trouble of having each lot analyzed on arrival. This, I believe, would be a step in advance and in the right direction. From his own admission Mr. Hill lacks the necessary qualifications of a practical foundryman, having had no actual experience in this industry outside of that which he obtained in a "mud pie" foundry attached to some engineering school. As my paper was only intended for such of the practical foundrymen as are interested in chemistry as far as it relates to foundry ma-

terial I did not expect such as Mr. Hill to derive any practical benefit from its perusal. However, as Mr. Hill is in the business, and as a superintendent at that, I shall be glad to contribute my mite of information toward setting him on the right road to obtain the results he desires.

There were three or four articles published in THE FOUNDRY some months ago from the pen of Mr. W. G. Scott which would be of great value to Mr. Hill, as would also other books or pamphlets touching upon the question of mixing iron by analysis. The metalloids most frequently figured are silicon and sulphur, and the method most commonly employed is as follows:

Kind of Iron.	Amount Used.	Silicon.	Sulphur.	Total Silicon.	Total Sulphur.
No. 2	700 lbs.	2.50	.025	1,750.00	17.500
No. 2X	500 "	1.75	.025	875.00	12.500
Steel	700 "	.05	.050	35.00	35.000
Scrap	100 "	2.00	.025	200.00	8.500
	2,000 lbs.	.....	.....	2,860.00	73.500

2,860.00 points silicon divided by 2,000 lbs. gives 1.43 or $\frac{2,860.00}{2,000} \div .20$ for loss in melting = 1.23 silicon; again, $\frac{73.500}{2,000} + .040$ for absorption from coke = .0773.

The other elements are figured in exactly the same way. It makes no difference in the method whether the charge is a ton, more or less, the amount of pounds in the charge or mixture becomes the divisor of the number of points found.

In chemical analysis as with other things those who mix iron should be practical men of experience and able to judge from the kind of work to be made just what analysis will be most desirable and produce the best results in the castings, whether these be made from gray iron or semi-steel. The form, weight and design of castings has a great deal to do with this, which can only be learned by experience. For instance, many styles of Corliss cylinders have been cast with irons as low as 1 per cent in silicon and sulphur as high as .09 (coke irons) when cast vertically, while many of the common steam cylinders, cast horizontally demand an iron sometimes as high as 2 per cent in silicon. I should judge the iron of which Mr. Hill gives the analysis to be a soft fluid iron, fairly close grained, but weak and suitable only for a mixture intended for light and medium machinery castings. The best way to send a sample to a chemist is to send fine drillings from a number of pigs taken from different parts of the car or pile, as he can not arrive at an accurate analysis if he is only sent a little piece of iron. It is also unnecessary to expend a ten dollar bill for every lot of iron as the determinations for silicon and sulphur are ordinarily sufficient, because phosphorus and manganese remain fairly constant in all brands of iron as long as the furnaces use the same ores, fuel and flux.

A course in chemistry is of course the proper thing and its thorough knowledge a necessity, but as the writer has reason to know, few practical foundrymen can devote the necessary time to quantitative analysis, and, as at present most of our employers would not care to establish a laboratory in connection with their foundries nor pay us a greater salary for our knowledge and the extra time and expense required in accumulating this, and because it is not pleasant or conducive to peace of mind to have a lot of dangerous re-agents and delicate instruments laying around at home, we must depend upon the blast furnaces to furnish us honest analyses for the time being or until those who own foundries can be made to see that a laboratory is not only a very handy thing to have but a first-class investment as well. The first requirement in Mr. Hill's case is to find by experiment the chemical analysis which gives the best results in his castings, then stick to this, using reasonable precaution in selecting irons which as nearly as possible meet the requirements of the castings. Do not be too hasty in mixing extremes and always remember that chemistry is not the whole thing; still, it is a great cost reducer—at least I have always found it so.

JAMES A. MURPHY.

Mixing Iron by Analysis.

When reading H. A. Hill's letter on page 238 of THE FOUNDRY for February, it seemed to me that many other founders were in the same dilemma. While I am not at liberty to make analyses for Mr. Hill, I shall be happy to help him, and other founders, to use chemical analysis.

Ten dollars for six determinations is a very low price, and the cheapest way is for him to continue to get analyses from New York. He could not learn to make analyses in a laboratory of his own and attend to his other business. He probably knows what the chemical composition of his castings should be, if not he must select a casting that suits him and have it analyzed.

If he has not other irons on hand he must order grades of iron to mix with the iron he now has to make castings of the required composition. He should not use less than four

kinds of pig iron and each carload should be analyzed and piled separately and marked.

If he uses scrap it must be carefully assorted in separate piles with an average analysis of each. He must then calculate how much of each pile of pig iron and scrap and of his own remelt is needed.

When the castings are made another analysis must be made to find whether the result is as calculated. If there is a variation change the mixture until the castings show the desired analysis.

When it is found that other elements continue fairly uniform, it will be necessary to have only silicon and sulphur determined.

The expense of the first analysis should not exceed $100.00 and about $5.00 per day afterwards. He should use test bars to see if strength, chill and hardness are satisfactory.

After obtaining this data if Mr. Hill will publish the results and his experience in THE FOUNDRY I will endeavor to show what improvement could be made.

CHEMIST.

Mixing Iron by Analysis.

If Mr. Hill, who tells his experience in the February FOUNDRY, will send me $16.00 I will send him a measuring scale and test bar patterns by which, for three cents and ten minutes' time each day, he can by mechanical analysis produce the required quality of castings at the least cost. If he fails to do this I will return his money and take back the apparatus.

W. J. KEEP.

Why the Variation?

I have been making columns, 16 feet long, 11 inches diameter and 1 inch metal, weighing from 1,550 to 1,600 lbs. I allowed one-eighth inch to the foot for shrinkage, and they came out from one-half to seven-eighths inch too long. Then I only allowed 1 1-2 inches to the 16 feet, and they still gave trouble. Some were all right, while others were too long, as usual, by about one-half inch. The class of iron used was of a very good quality of scrap mixed with stove plate and No. 1 soft pig iron. The machinery scrap used was the remains of a planing mill after a fire; it was free from steel or wrought iron. The charges were made up as follows: 350 lbs. machinery scrap, 100 lbs. No. 1 soft, 50 lbs. stove plate scrap. This gave me a charge of 500 lbs. The iron when cast seemed to be of good quality. The columns that were too long were cut off and found to contain a very good grade of iron.

Now, what caused this unequal shrinkage, when conditions were, as far as practicable, all alike? I don't think it necessary to say of what material the cores were made, as that would exercise no influence. However, they were the old flour core—1 part flour and 8 parts sand, wet with molasses water.—J. A. Beler, in *Iron Molders' Journal.*

Answering the above questions, Thos. D. West says: The reason for the variation in the contraction of columns is due, when molds are exactly alike in thickness and length, also in manner of cooling, to variations in the grade of iron used. The article gives the physical mixtures of iron used and states that conditions were, as far as practical, all alike.

It is utterly impractical to select pig and scrap iron, without knowing their chemical analyses, especially pig iron, and obtain uniform contraction in columns or any other castings made at different heats. If the founder making these columns worked by chemical analysis and took care that all blast furnace casts of pig iron were well mixed so that one end of a furnace cast was not different in its silicon, sulphur, etc., than the other, and had experience in selecting scrap iron, so as to know what grade it would give when remelted, he should go on casting day after day, providing his fuel was the same, and have little, if any difference in the contraction of such columns, but only by utilizing chemistry in making mixtures of iron can this be done.

W. J. Keep refers to the same subject as follows: Answering the question as to the variation in the length of columns cast under similar conditions and with a mixture of machinery scrap and of stove plate, I will say that it is impossible to have the conditions alike. The first iron that comes from a cupola shrinks more than that which is melted after the cupola is hot. There is a great difference between the first and the last iron in a heat, lasting two or three hours.

The conditions on different days can never be the same. The only way to have all alike would be to catch the iron for all in one mixing ladle, and then there would be some variation. The only way to have the chemical composition uniform would be to break each piece of scrap into small pieces, stove plate and all, and mix it thoroughly before charging any of it. The fact of scrap being

stove plate does not insure uniformity. Each stove is different from all others.

Each machine in the old planing mill was made in a different foundry and was of a different composition.

Because the scrap all came from one burned down planing mill did not make it alike.

After doing the best you can to make all conditions uniform you will be obliged to turn or chip off some iron to bring the length the same.

Cost of Fine Brass Castings.

There are those who would like to know the cost of producing ornamental brass castings, such as used in the make-up of ornate fixtures for gas and electric light, also for the decoration of furniture, for architectural purposes, etc., including such work as cored hollow arms for leading through the same gas and electric wires, also cored cock barrels and other fixtures. I give below some figures recorded by myself as the cost of production of such castings in the establishment of which I have charge. It includes work from the plainest chain links to the most highly decorated parts, solid or with core, and all of light weight. Considerable work also was made from wax patterns, and this being handled in the hot season was exceedingly difficult.

We melt up, as will be seen, all our own sweeps and turnings. The sweepings have the iron taken out as well as it can be with a horseshoe magnet, and they are then weighed and charged. The automatic turnings are set aside in barrels with perforated bottoms on top of pans, to allow the oil to drain off. Then when oil is no longer strongly perceptible on the turnings they are weighed and charged against the foundry. The turnings from the turning lathes, with more or less wood turnings, are weighed as swept up and charged. The prices for these sweeps and turnings, as shown in the account below, are the same as the concern received from smelters previous to my taking charge, when all the turnings and sweeps were sold. We have no separators, so that we are considerably hampered in this respect, until one is either purchased or made to do this work. We use Windsor Locks sand. Our spelter, it will be noticed, is not of the dearest quality, but it has given satisfaction, and our product is of good color, taking on an ormolu effect of very satisfactory character, and up to the present we have had no trouble with our cock metal, that might suggest danger from use of turnings.

For the sake of arriving at least approximately near the actual amount of core work, wax pattern work, plain work, etc., turned out, I give as near as possible (having no actual record) by a research of other memoranda, a table of the proportions of work of various characters as follows:

Plain castings	.915
Statuary bronze	.025
Core castings	.05
Castings from wax models	.01
Total output	1.00

ONE MONTH'S EXPENSES.

945 lbs. Spinner's Scraps	at	.10	$ 94.50
1266 lbs. Floor Sweeps	at	.03	37.98
27½ lbs. Pipe Scraps	at	.10	2.75
240 lbs. Automatic Turnings	at	.08¾	21.00
506 lbs. Spelter	at	.05	25.30
7 lbs. Phosphor Tin	at	.35	2.45
1239 lbs. Copper	at	.17⅜	215.28
1 bbl. Charcoal Facings			3.50
6 No. 20 Crucibles			6.60
2 No. 30 Crucibles			3.30
Flour			.99
Charcoal			1.30
Coke			22.60
10% Depreciation on Plant			7.00
Wages for the Month			246.17
Total Expense			$690.72

We turned out in the month 3,990 pounds of castings. Then $690.72÷3,990 pounds=.173—; or, approximately, the cost per pound was 17 1-3 cents.

I might add here that in the wages charged there is included a day's pay for all hands, which day was spent in moving the foundry to the upper floor and on which day no furnace fire was lit. Chandelier makers of high-class design will ask, no doubt, how about false core work? This work is at present done in other departments, and therefore is not included in this account. The foundry pay roll includes one hand not engaged in molding but who does all the gating of the jobs as they are ordered.

I believe the above will give a fair idea of a low-cost system. A smaller shop not having the scraps and turnings would naturally be unable to turn out the product for so low a price. There is many a small ornamental brass foundry running today that is not paying, but which is maintained simply because it is convenient to have the foundry near at hand, and while it would be of course preferable to get castings at the lowest figure it is found impossible to get another foundry that will or can be expected to give immediate attention to the orders when wanted; therefore it is more satisfactory to maintain a foundry, though it does not always produce castings as cheap as does a larger

foundry. I do not give the above account as an example of cost keeping, but I believe there are points of interest that may be of value and interest to those engaged in ornamental brass castings. I have omitted all reference to rents, general burdens, etc. I do, however, charge $7 monthly for depreciation, and only do this to give an idea of cost of plant.—*John G. Niederer, in American Machinist.*

This Cupola Caught Fire from the Chimney.

Hose company No. 8 was summoned shortly before 8 o'clock last evening to the Rochester Car Wheel Works, at the corner of Leighton and Barnum streets. The cupola was afire, having caught from the chimney, it is thought. The firemen soon had a stream in operation, and the fire was put out without much damage. —*Rochester (N. Y.) Democrat and Chronicle.*

The Latest Exploit of Charles L. Hartsfeld.

The cat is generally supposed to be the only animal possessed of nine lives, but evidently certain species of the human race can give the cat cards and spades and then beat him in continuing to exist. Since THE FOUNDRY came into existence it has at various times paid its respects to one Charles L. Hartsfeld, who has been known as the president and manager of the Hartsfeld Furnace & Refining Co., of Newport, Ky.; general manager of the Southern Steel & Aluminum Alloy Co., of Rome, Ga., and the promoter of the National Ore & Reduction Co., of St. Louis, Mo., and later the Mexican Ore & Reduction Co., of Durango, Mexico. Mr. Hartsfeld is also extensively, though not favorably, known as the inventor of ferro-nickel manganese calcium fluoride, aluminum nickel alloy, aluminum alloy composite, and other nostrums which he advocated the use of in anything from armor plate to harness buckles. There is also a water-jacketed furnace which bears the name of Hartsfeld, which is guaranteed (not) to produce "Schmiedbarenguss" or weldable and semi-wrought iron and steel castings.

When THE FOUNDRY first expressed its doubt as to the ability of Mr. Hartsfeld to carry out his promises in the metallurgical field this gentleman threatened to have its editor put in stripes, but later relented, much to our regret. THE FOUNDRY has made it a point to keep in touch with Mr. Hartsfeld, because he is such a cheerful liar, possessed of the firm belief that a new crop of suckers comes out each season, and that he will never suffer for lack of people, who are ready to sink their spare change in giving him a living to which he is not entitled.

Mr. Hartsfeld, like the tapeworm, never ceases operations until the whole of him is removed. No sooner are his dishonest practices shown up in one place than he bobs up in another. He has no scruples about quoting the names of firms or individuals, without their knowledge or consent, as recommending his "fakes." It will be recollected that in his Mexican operations he referred to Stahlknecht & Co., bankers, of Durango, as to his financial standing. These people repudiate him and his claims as to their being connected with him in any way or users of his product. Upon first arriving on Mexican soil Mr. Hartsfeld proposed the organization of a company to manufacture his wonderful "furnace," and when this fizzled out he began to sell the flux, which justly earned him the title of "the Mexican flux fakir." Strange to say, this was supposed to be manufactured by the Howard Chemical Co., of St. Louis, Mo., a concern which never existed, at least, not as a chemical works. Advertisements of this flux were offered to every paper which it was thought could not see through the swindle, but the advertisements were never paid for, and at last the Mexican government stopped the mail of Mr. Hartsfeld, and having thus lost his source of income he promptly left Durango.

During the early months of last year the aforesaid Charles L. Hartsfeld appeared in Detroit, Mich., accompanied by several samples of weldable iron, which he claimed to have manufactured while in exile at Durango, Mexico, through the medium of his private furnace and with the aid of the before mentioned "flux," in itself one of his great discoveries. The sample which has come under our observation bears a strong resemblance to a piece of an old file, and if it ever passed through the Hartsfeld furnace it was dropped through before the bottom doors were put up. We do not need to repeat the claims which Hartsfeld made for the wonderful metal he was in the habit of tapping from his furnace, as these included nearly every virtue known and none of the faults common to other processes. Suffice to say that the Hartsfeld product would beat the best wrought iron to a standstill, and could be made for less than one-half the cost of the former. All of this according to a gentleman whose business card read:

C. L. Hartsfeld,

Metallurgical Mining Engineer and Chemist.

Special attention given to thorough examination of Mines, and most practical treatment of Low Grade Ores.

Office, 415 Locust Street,

Room 203, Telephone 272.

TWENTY YEARS' EXPERIENCE. HIGHEST REFERENCES. *St. Louis, Mo.*

CABLE ADDRESS, HARTSFELD, ST. LOUIS, MO.

Naturally a person with a cable address draws a crowd. Strange to say, at the office given no one ever heard of such a chap as Mr. Hartsfeld, but probably this gentleman was traveling incognito when he engaged quarters there, or perhaps he just leased the office in his mind. At any rate, he of the highest references had a process of putting pig iron and scrap into a furnace of his own construction and mixing in some flux, the whole giving wrought iron castings such as the world never saw and never will. The whole thing was no experiment with him, according to his testimony, not taken under oath, as he had already produced castings weighing from "one ounce to one ton." All that he needed was sufficient coin of the realm to have one of his furnaces made and lay in a small amount of necessary stock, and at the first cast those who put up their money would begin to draw dividends, alongside of which those declared by the Standard Oil interests would appear as nothing.

To use an American expression, discoverer Hartsfeld struck Detroit "on his uppers," although he claimed that his Mexican interests brought him in $150 a month. Perhaps he meant bills for this amount. After exhibiting his samples to several manufacturers these dismissed him with the statement that they would pay him a quarter of a million dollars to prove his claims. For some reason best known to Mr. Hartsfeld he concluded that this was more money than he wanted, and instead went to work to organize a stock company. Concerning this a gentleman who, much to his sorrow, became acquainted with Hartsfeld of many locations, and of no good reputation anywheres, speaks as follows:

"Hartsfeld had attempted to organize one or two companies before I learned of the 'wonderful metal,' and, having a few dollars at my disposal, I went in with several others, and we organized the American Wrought Iron Casting Co., with a capital stock of $10,000 (1,000 shares at $10 each). Much to my surprise the stockholders consisted altogether of workingmen, small storekeepers and clerks. Hartsfeld was given five hundred shares of stock for his patent, and in consideration of this he assigned all his rights in his furnace and flux, together with what 'inventions' he had or would make in the future in 'metals of any kind' to the company. In addition he was to erect the plant and start it off in working order. The confidence displayed by Mr. Hartsfeld in his ability to make the first heat a success would have convinced anyone who had no more knowledge of the foundry business than we did.

"The gentleman from Kentucky, Missouri, and Mexico was practically the American Wrought Iron Casting Co.; no one knew anything about iron except him, although it was hinted that there were several 'iron men' among the stockholders. Later on these 'iron men' proved to be a few molders, who had pounded sand in a local factory for several years, and whose knowledge of iron was limited to their ability to put up a day's work of a certain specialty.

"When $4,000 worth of stock had been disposed of he with the flux and the furnace was given power to 'go ahead and produce.' According to his original calculations $2,500 would pay for buildings and everything. Out of this would have to come $1,850 for that remarkable furnace, but taking into account that it was to have a capacity of from ten to twenty tons, and that it was to be water-jacketed, this could not be considered excessive. Hartsfeld kept suggesting alterations until the $4,000 were gone, when we raised $2,000 more, and this soon disappeared. Then he loaned us some of his stock, which was sold at as high as $32.75 a share. All of this goes to show that 'some people' thought our chances for success were above par.

"Much to my surprise, when the furnace came, our wise man, the inventor, did not know how to put it up, so an old molder volunteered to help him out. Hartsfeld had his own way in everything, and after a great many delays and promises he finally set a day when he

would 'pour the iron.' Naturally the majority of the stockholders were sufficiently interested to be there, to watch the appearance of that metal on which they had staked their hopes and coin.

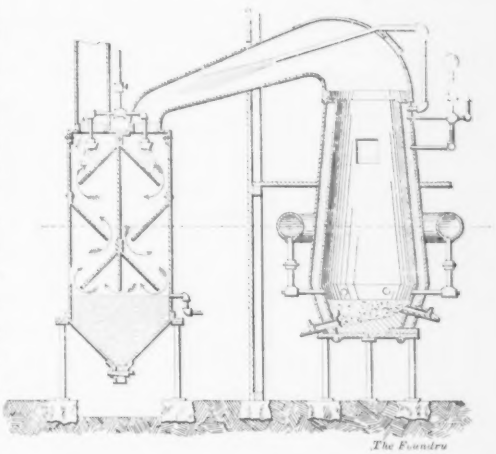
"Hartsfeld, the great prestidigitator from the banks of the Ohio and the Big Muddy did 'pour iron,' but it was the poorest quality of gray iron which ever left a furnace. It was absolutely worthless except for sash weights, and evidently his furnace had spoiled good iron instead of converting it into wrought iron. Four or five trials did he make, but the result in each case was the same, and all were promptly followed by excuses why the Hartsfeld aggregation could not fulfill its promises.

"The officers of the company were by this time becoming anxious for something to materialize, so one Saturday Hartsfeld was asked to state whether he could not carry out his original claims, or whether he could and would not, to which he replied that just as sure as the sun rose Monday morning so would he, on that day, produce THE metal. Instead of doing so on the following Monday he dismissed all hands, and later it was learned that he had made a trip to Buffalo and certain points in Canada, evidently on the lookout for a new place whose climate would be more favorable to sprout his wrought iron castings than that of Detroit.

"At this point the stockholders of the American Wrought Iron Casting Co. thought it wise to apply for the appointment of a receiver, in order that its affairs could be closed. This was done, and from present indications it appears as if every creditor will be paid in full.

"During his stay in Detroit Hartsfeld had the assistance of one Henry J. Klein, who styled himself 'assistant superintendent.' At one time this Klein figured as the manager of the fake Howard Chemical Works, in St. Louis, but on the pay rolls of the Detroit company he was put down as 'helper,' and his salary was ten dollars a week. The only duties he is known to have performed as assistant superintendent were to run errands and answer the telephone."

In order that our readers may have a fair idea of the extent to which it is possible to waste good material, we reproduce the attached sectional illustration of the Hartsfeld furnace, as it appears in the Mexican patent records. One would naturally suspect that any person who could get up such a damphool arrangement would never need to let his trousers become baggy. Some of the claims made by Mr. Hartsfeld sound a good deal like a perpetual motion scheme, as for instance this sentence: The purpose of my invention is to construct a furnace with a water jacket in



THE HARTSFELD FURNACE AS IT APPEARS IN THE MEXICAN PATENT DRAWINGS.

which during the process of fusion the sulphur of the metal is utilized instead of fuel. Another purpose of my invention is to combine with the furnace a steam condenser for the recovery by the action of condensation and precipitation of the volatile gases which arise from the fused metal.

This is certainly rich. The idea of removing sulphur by utilizing it as a fuel probably never occurred to metallurgists until this great fakir crossed the Rio Grande. Of course, he never melted very long heats in this furnace, because if he had there would have been an explosion, which would certainly have settled both him and his water jacket. He says that the reason for not using brick work in his furnace is that this is costly and might be amalgamated with or destroyed by the slag. Just to be sociable, however, he consents to daub up the bottom of his outfit. The only thing he forgets in the drawing is a pump for supplying the furnace with water as fast as this is generated into steam and blows out through the safety valve.

While working his graft in Detroit, Prof. Hartsfeld alluded to the megaphone-like arrangement which connects the furnace and the condenser as the "downcomer" and explained that while the furnace was melting wrought iron one day the condenser would at the same time be busy making a supply of the much

needed flux for use on the following day. The whole thing is one of the finest impracticable ideas which has ever been placed on the market and been favored with a bid.

Thus ended another chapter in the history of Hartsfeld, though we shall doubtless be able to record others as long as he lives and people will continue to invest their money blindly. If any readers of this journal should observe anyone proposing the organization of a company to sell fake flux or to make wrought iron castings in a patent water-jacketed furnace it will be well to send for the police. The chances are that Hartsfeld, with another of his fraudulent schemes, will not be found far away.

Some Skimming Gates.

From time to time articles and illustrations bearing on this subject have appeared in the columns of THE FOUNDRY, each giving the opinion of the writer as to the merits of different devices used for the purpose of obtaining cleaner metal for the mold. It may be of general interest to show some illustrations of old forms of skimming gates, which have been used or suggested, without in any way attempting to dwell at great length on the fact that some are very good and others are of but little earthly use. The skimming gates of which we herewith show illustrations have already been the subject of patents and it is sufficient to say that each inventor claims that by the use of his device castings are invariably obtained which are absolutely sound and faultless. The fact that but a few of these skimming devices are in extensive use at the present time would seem to indicate their general worthlessness. Yet, for all of this, there are many other causes which sometimes prevent an invention from becoming known or used. If anything shown herein shall give to the foundryman an idea which he can work up into something useful, the purpose of this collection shall have been accomplished. Most of the types of skimming gates shown are capable of accomplishing the desired object to a greater or less extent, and their real value will usually be found to depend chiefly upon the cost which they add to molding. Perhaps some of these can be simplified sufficiently to give them a value which they did not previously possess.

Those devices which have recently been described in THE FOUNDRY and in the well-known books on foundry practice written by Messrs. West and Bolland and those which are now protected by patents in this country are not illustrated here. All of the examples shown are either not patented or the protection from this source has expired through time limitation.

Skimming gates may be divided into two classes, those in which the entire gate is made in the body of the mold by means of a pattern or cutting out with a molder's tool, and those which are made separately in the form of a dried sand core, which is placed against the pattern in ramming up the mold. To the first class belongs the skimming gate shown in Fig. 1, and it is one of the earliest devices of this kind to be patented (1870). But Fig. 2 shows a form of skimming gate which is undoubtedly much older. It is taken from an anonymous English book called "Practical Iron Founding," and its use is recommended by Jos. Horner in a recent article in an English trade journal. R. D. Moore has also contributed some articles on the subject of skimming

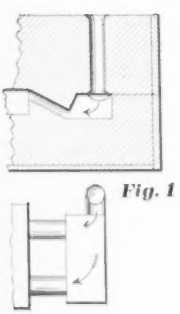


Fig. 1

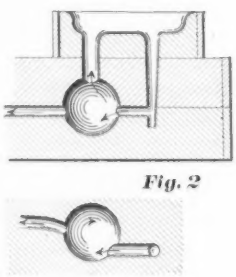


Fig. 2

The Foundry

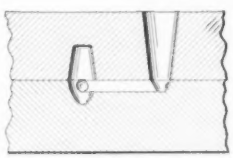


Fig. 3

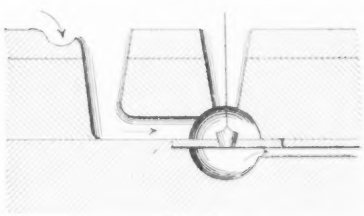


Fig. 4

TYPES OF SKIMMING GATES.

gates to the columns of THE FOUNDRY and in one of these he says that in 1840 or earlier, while an apprentice, he saw a molder run iron through a ball into a casting that was to be finished and thought it a smart trick. Mr. Horner recommends the spherical cavity shown and also suggests one shaped cylindrically, or disc like, but Mr. Moore prefers a sort of a ball shaped more like Fig. 3, which represents stream of metal to fall through and afterwards burns out so as to give a gate with a full opening was described in the December issue of THE FOUNDRY by Mr. E. C. Wills. Both of these ideas are protected by patents which were granted to John Walker, of Cleveland, nearly 15 years ago. Mr. West suggested something very much like it about the same time. A form of construction which has been

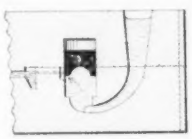


Fig. 5

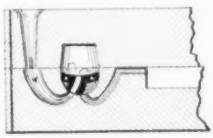


Fig. 6

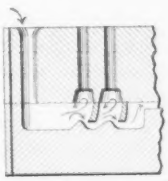


Fig. 7

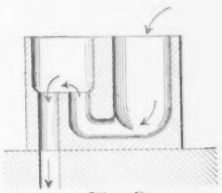


Fig. 8

SOME PATENTED SKIMMING GATES.

a recent English design. The skimming gate designed by Cross and Gabriel, the patent of which recently expired, is well known and has been on the market for a number of years. This is made right or left-handed, and in construction is very much like the skimming gates shown in Figs. 2 and 3, with the addition of a skimming core. An improvement on this was patented two years ago by J. B. Renshaw, of Hartford, Conn., which consists briefly in developed from the plug and the device shown in Fig. 2 is the "Texas" skim gate.

There is another style of skimming gate belonging to the first class, which is of German origin and has attracted considerable attention in that country. It consists in the provision of a float in the skimming basin, as shown in Fig. 5. A similar device was described in a German journal in 1893. Instead of the cavity in the bottom of the float for

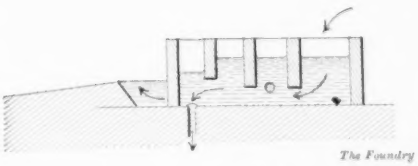


Fig. 9

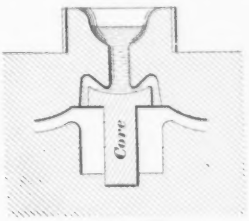


Fig. 10

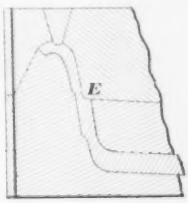


Fig. 11

DIFFERENT FORMS OF SKIMMING GATES.

pivoting two or more of these patterns to that part which forms the main gate and in addition make some minor changes in the form of the pattern. Messrs. West and Bolland have illustrated and recommended several modifications of these devices.

Among the many other styles of skimming gates belonging to the first class there is one which frequently comes up in one form or another, which calls for a stopper to be placed in the gate until the runner box is filled with metal when the stopper may be removed. The use of a perforated sheet of metal in the gate which at first allows a small collecting impurities, the float is perforated so that they can pass through and thus remains above the gate leading to the mold. Fig. 6 shows a similar idea, which is also German, and was first shown in print about 12 years ago. The holes in the disc through which the metal passes into the mold are, of course, smaller than the one through which it enters the skimming basin.

Harrison's skimming device, shown in Fig. 7, has two skimming cores similar to Cross and Gabriel's. W. A. Jones patented an improvement on this in 1893, in which he makes all of the parts belonging to the skimming

gate proper of dried cores. Little's device, illustrated in THE FOUNDRY, of January, 1900, is an improvement on Truesdale's patent of 1874, which is shown in Fig. 11. The idea of giving a whirl to the metal in the mold for such casting as chilled rolls in order to keep the impurities near the center and away from the face of the casting was the subject of a patent granted to J. Harley, in 1835. His original device was costly and has been considerably improved. His patent, however, furnished some ideas for casting car wheels, which were brought out 20 or 25 years ago by Sax and Lobdell, in which the car wheel is poured through a hollow core. Among other ideas employed in connection with the casting of car wheels may be mentioned Baker's device, which is shown in Fig. 10, and needs no explanation. Wiesing merely used spindle shaped runners, enlarged at the top to hold back the metal. Bouton suggested two dish-shaped cavities, one under the other, connected by a central vertical runner, and placed over the center of the mold a series of runners extending from the bottom cavity to the circumference of the mold, which was so curved as to give the metal in the rim a whirl, while the lower basin was supposed to act as a skimmer. The second class of skimming gates is represented by Baker's design, patented in 1879, and shown in Fig. 8, and another German device, Fig. 9. It would seem as if all devices belonging to this class should be called skimming basins rather than skimming gates. Van Riet's centrifugal skimming gate is a Belgium invention which has three round pockets, or reservoirs, each tending to collect the dross found in the metal and passing a purer iron to the next pocket, and finally to the mold.

A very peculiar thing in connection with this subject is the description of the "Amalgamation Skimming Gate" in *The Iron Molders' Journal*, of March, 1901, and the criticisms appearing upon same in the May number of that publication. This device in construction bears a strong resemblance to that of Van Riet's, but it is not as old as Tubal Cain, as the second writer on this subject declares. The curious thing about it is that Mr. Riffle, the inventor, claims to have patented it and gives the number of the patent which upon examination proves indeed to be a patent to J. A. Riffle, but has absolutely nothing whatever to say about skimming gates or the art of metal founding. Mr. Riffle's critic suggests that he get a patent on the name, and if he had known that this patent was granted on an amalgamator instead of on a skimming gate he would no doubt have had a whole lot more fun with Mr. Riffle.

A. E. FAY.

Molding a Stack Base.

Some of the readers may call this a chimney base, the plan for this is shown in Fig. 1. It

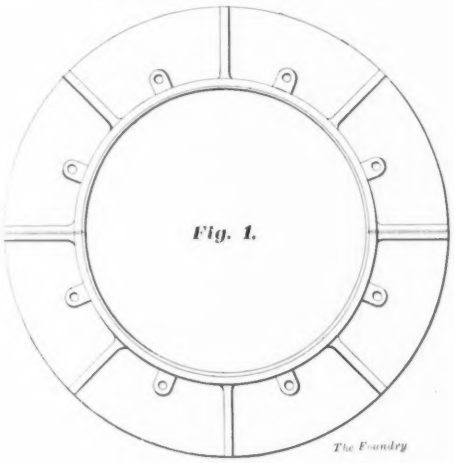


Fig. 1.

belongs to that class of castings which may easily be made with the aid of a sweep. Fig. 4 shows the spindle and necessary sweeps to turn out this job. After the bed has been swept up the section of the pattern shown in Figs. 2 and 3 is attached to the spindle. As made in this case it is one-eighth of the circumference of the casting. Care is taken to ram each section of the mold up level and

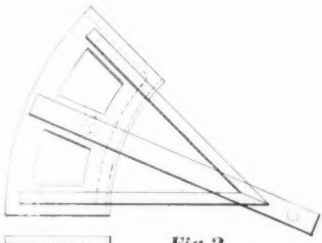


Fig. 2

Fig. 3

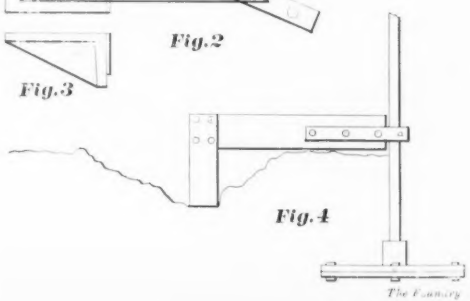


Fig. 4

to see that it is well vented to a cinder bed and weak points of the mold strengthened by the insertion of rods. As the casting is to be split it becomes necessary to use plates provided with a very thick coating of blacking. When the mold is finished it is covered with cores,

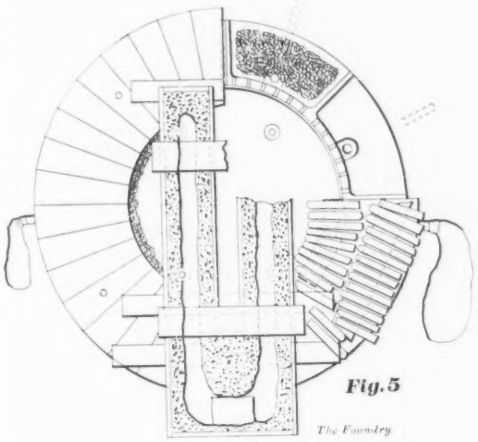


Fig. 5

The Foundry

the joints of which are carefully covered over with paper to prevent any loose sand from finding its way into the mold. The cores are then weighted down after the manner shown in Fig. 5, which is a general plan view of the finished mold.

R. H. PALMER.

The Education of Workmen.

In the matter of education, it has become very much the fashion to represent the modern mechanic as hungering and thirsting after knowledge; he feels the want of better information than he had opportunity to obtain in his youth, and only lags behind his fellows because he cannot "figure," or does not understand the principles of the work he is engaged upon. This may be true, and is, in isolated cases; but such individuals only prove the exception to the rule, which last is, as I have found it all over the country, wherever I have worked, that the average man does not require, or even desire, to be better educated. He sells muscle and manual dexterity only, and does not need any theory or a knowledge of x plus y to obtain the highest wages in his craft. Such men sometimes are called "ignorant," but that is an absurd appellation. What are they ignorant of, pray? Binomial theorems, no doubt, and the meaning of a geocentric parallax, but they are in no wise concerned with these, and would not get a penny more for their labor if they had the fullest knowledge of them. Education is a word that means nothing whatever in isolation; the forest runner is a highly educated man in all that pertains to the means by which he lives and has his being; he can find his way back to civilization through a wilderness that would appall the man of the schools. Professors of this or that science are educated men only in the sense that they have traveled the same ground that their fellows did ages ago, and have digested mentally the discoveries or theories of others. In exceedingly rare cases have they added to the sum of proven facts available to all. The expert workman is an exceedingly highly educated man, when he has acquired a full knowledge of all the routine and the several processes needed to produce a highly finished piece of machinery; that he professes to understand, and he spares no pains or labor to make himself a past master of his profession. This aspect of the mental status, or intelligence of the workingman will not, possibly, be accepted by some, but so far as my observation and actual participation in the daily work of a shop goes it is correct.—*E. P. Watson, in Iron Age.*

One-Sided Co-operation.

Mr. Osborn's article in the December FOUNDRY describing some foundry book-keeping and the results which follow is very interesting, because cases of this kind where efforts of the foundry foreman are unappreciated are altogether too common. In this case he furthered his employer's interest by making improvements in patterns and flasks whereby production increased and cost lessened, yet, because his employer chose to consider only the cost per pound instead of the cost per piece he is called to account. Altogether too often this kind of treatment follows the invention of ingenious devices by the molder. There is no calling to my knowledge which requires better judgment and patient ingenuity than that of the molder, nor none where physical and mental energy are so regularly taxed to the point of exhaustion. Working in all kinds of temperatures and performing at times the severest kind of labor, one must indeed have a very perfect constitution to keep up in the race. Taking his surroundings into consideration, it is really a wonder that any original ideas at all emanate from the molder, and it is so much more a reason why improvements in methods suggested by the sand artist should receive approbation from the manage-

ment, who, in the end, are the beneficiaries thereof.

Notwithstanding the molder's environment he has, at times, some very bright ideas and I have seen rather tough looking specimens who would not be suspected of being able to write their own name scratch several designs upon the floor and thereby show how improvements could be made. Possibly a shop mate will suggest that it is a first-class idea and that the molder had better tell the foreman about it or the draftsman, but if the one with the inventive genius is an old hand at the trade and has traveled around much from shop to shop he will likely say, "Not if I remember myself. I would not even be thanked for the idea. I have been there, pardner, and know whereof I speak."

A well-known manufacturing company who had their castings made by the job in their own foundry had for years had a certain casting made by a reliable, "there every day," kind of a molder at a mutual and agreeable price, the company assuming all risks. In the course of events this molder, whom we will call A, left and a younger molder, whom we will designate as B, took his floor and job. This being something of a promotion for the latter he was ambitious to do as well as had A, if not better, and the job was handled in first-class shape and in every respect better than it had been by his predecessor, and the percentage of loss was considerably reduced. In addition, the surfaces of these castings were much smoother and possessed an all-around better appearance. After about six months' service, much to B's surprise, the foundry foreman notified him that the superintendent said there should be a cut of some twelve per cent from the price paid for the job. Upon inquiring B learned that this was the only job on which a reduction was contemplated, and in view of this fact it seemed as if to accept a reduction was a heroic dose to swallow.

In his mind he debated the question as to why he should be singled out alone. The foreman gave him no satisfaction. If he knew, he would not tell him the reason for what had occurred. B began to make a few investigations on his own account to learn how his work compared with that done by the molder who had the job before him. Much to his surprise he found that his castings weighed much less per piece than those made by A, and this occurred at the time when iron was considered worth 2c a pound running from the cupola spout. There were a number of hearings over this, to B, momentous question. The foreman was a good man with a heart that held a warm corner for all decent and self-respecting molders. In one of the interviews which B had with him he spoke as follows: "When A run this job everything was satisfactory between him, yourself and the company. There was no complaint as to quality or the cost of molding. I find on looking the matter up that the lightest casting from this pattern made by A exceeds in weight some fifteen pounds the heaviest casting which I have made. Now I have a proposition which I would like to submit the manager. We will take the lightest casting made by A and call it a standard as to weight. All the iron I can save by this standard I am to receive one cent a pound for. As iron running from the spout is worth at least one and three-quarters cents per pound the company will make something from the iron saved, as every casting will perform its part, whether it be light or heavy, and in addition I will agree to assume all risks from bad castings, contract to continue for one year. Please inform the manager of this proposal and that, if convenient, I would like to take the matter up with him." To all fair minded foundrymen this proposition should at least have appeared worthy of consideration, something worth encouraging, as it opened the door to possibilities in other directions. It could not help but result in more careful work and would practically amount to the inauguration of the premium system. Now, do you think that this manager granted B an audience or that his proposition was accepted? No, indeed, the answer came back the reduction in cost would stand and that there was nothing to talk over. They were not going to add more complication to their foundry bookkeeping than this already possessed.

In another case I know of a foreman who had, among other jobs, a casting which was particularly slow to mold under existing arrangements. A fairly industrious molder could by keeping on working right up to the time of pouring manage to turn out eighteen of these castings a day, for which he was paid sixteen cents each. The shop was small, business was rushing, and nearly every job was wanted in a hurry. To start another floor, even if a duplicate pattern could have been provided, was out of the question. Shipments were being delayed, although the orders were being filled as fast as possible. The telephone wires were kept busy between the fac-

tory and the city office of the company, and the foreman was continually being asked why he did not put on more men or why he did not catch up with the orders some way.

This particular job received considerable attention by the foreman and he soon designed a rigging at a cost of about twenty-five dollars whereby a molder could put up fifty castings a day, for which he received eight cents each, and in a few days this had been increased to sixty castings a day, and what also counted, the castings were much better than when made by the former method and three-quarters of a pound of metal was saved on each. Before the casting had been made in a three-parted wooden flask, while now it is made in a two-parted iron flask.

One would naturally suppose that an improvement of this kind should have interested the highest officers in any manufacturing concern, but not so in this case. Not a complimentary remark was paid to the foreman or anyone else.

There can be but little incentive to making improvements of this kind if those who benefit thereby are not willing to show any appreciation whatever. L. C. JEWETT.

Personal.

Charles Koll recently resigned as superintendent of the Victor Stove Co., Salem, O., to accept a similar position with the Enterprise Stove Co., of Vincennes, Ind.

William Fawcett, superintendent of the foundry of the St. Charles, Mo., plant of the American Car & Foundry Co., recently resigned his position. He is succeeded by John W. Lawler, who will superintend the wheel foundries of both the St. Charles, Mo., and Madison, Ill., plants.

George K. Weller has accepted the position of foundry foreman with the Detroit Register Co., Detroit, Mich.

Chas. Thomas succeeds Geo. O. Vair as superintendent of the Corning Iron Works, Corning, N. Y.

James E. Roach has resigned as third vice-president of the Iron Molders' Union to accept the foremanship of Rathbone, Sard & Co.'s foundry, at Albany, N. Y.

Gurney Olmstead has been placed in charge of the Leland & Faulconer Mfg. Co.'s foundry at Detroit, Mich.

Charles Champagne is now foreman of the Sill Stove Works, at Rochester, N. Y.

A Simple Molding Job.

The attached sketch shows one of those simple things which often call forth the exclamation, "Why didn't I think of it before?" It is a cap which screws onto a four-inch pipe and is used for a special purpose. The illustration shows a section of the casting and the shape of the core, also a bottom view of both core and casting. The pattern is made

A SIMPLE MOLDING JOB.

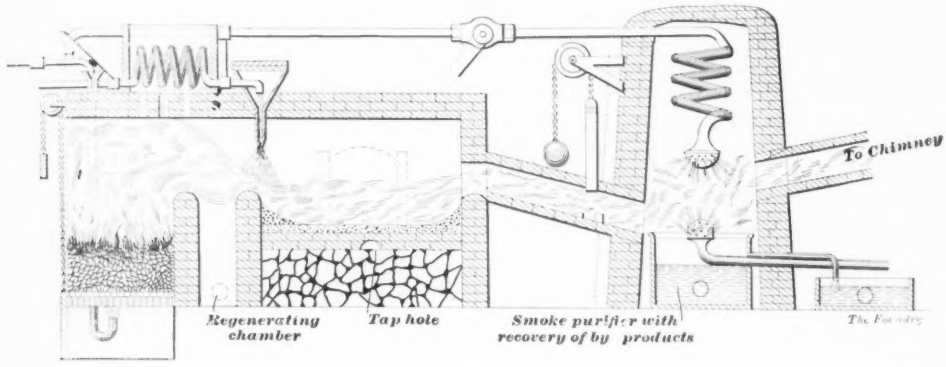
in one piece as shown, and the upper part of the core box is turned out of a solid piece, opening on top, giving an excellent chance to vent the core.

This core would usually be hung in the cope, the core being just the diameter of the cored hole. Needless to say this item of fastening the core in the cope took up considerable time and made an expensive molding job. By making the core, as shown, it may be easily set in the drag, the gate being first cut in the mold under it. Being short of suitable flasks one day and having a rush order for a lot of these castings, they were made in open sand by weighting down the core and, on the whole, this was considered a very convenient pattern and a satisfactory way of turning out this casting.

J. L. GARD.

Another Improvement.

Several moons have passed since anyone proposed any great revolution in the melting of iron, and the steam-spitting tuyeres coughed up by one of our friends in Canada were nearly forgotten when the attached illustration in *The Ironmonger* attracted our attention. It goes to show that our British cousins are fully awake and do not intend to let all the inventing be done on this side, and it is with pleasure that we observe them taking a hand in this. As *The Ironmonger* has it the illustration represents an improved reverberatory furnace, introduced by W. J. Clapp, of Balsall Heath, Birmingham, for the melting of iron and other metals. Among original features the new furnace has two bridges instead of one, and is provided with an apparatus for injecting superheated steam and lime into its interior, with the result that a heat very much greater in intensity than that of the ordinary reverberatory furnace is developed, accompanied of course by corresponding economies in the reduction of the charges. The improvements include the provision of an iron door enclosing the fire-box, thus converting the grate into a slow-combustion chamber. By this means it is possible to develop a heat sufficient to melt down a charge of common cinder-pig in about half an hour with a very small consumption of fuel. The same arrangement is also employed when it is found desirable to create a forced draught through the fire, the steam-pipe from the boiler being brought down into the chamber underneath the fire-bars. Another notable improvement affects the construction of the hearth of the furnace. This is now made in the form of a basin, and it is lined with a specially-prepared basic composition, capable of withstanding the enormous heat to which the interior of the furnace is occasionally subjected. Since it was first brought out improvements have been made relating to the position of the super-heater, which is now placed close on the top of the furnace-crown; to the arrangement of the tapping-hole, and to the formation of the apparatus used for purifying the smoke and recovering the by-products. As now constructed, the furnace may be used for melting pig and scrap iron and other metals without the aid of Mr. Clapp's ingenious lime-injecting arrangement, while with that device the furnace is capable of reducing ores of the most refractory description. As an example, it may be mentioned that it has been utilized with excellent effect for both calcining and reducing chrome ore. That being the case, there seems to be no reason why it should not prove equally successful in the treatment of the more refractory ores which abound in various parts of the world. The drawing illustrates the furnace in its modified form.



AN ENGLISH DESIGN FOR A MELTING FURNACE.

An irreverent friend of this paper says that the picture of this furnace reminds him of a moonshine whiskey still by the number of worms it contains.

Apprentices.

Much has been said and written with reference to what constitutes the best method to handle and develop the apprentice boy in the foundry. Many favor the plan that the apprentice be required to serve a term of four years with an increase of wages at the end of every year, regardless of his ability and ambition. Others think it is better to give them

an increase in wages semi-yearly, or even more often in cases that are deserving. Then there are a few who do not believe in the apprentice system at all, but feel that the best policy is to hire full-fledged molders and demand first-class work. Local conditions have a great deal to do in determining which method can be practiced to the best advantage. Take it where there are many manufacturing concerns, which offer better inducements than the foundry in the form of lighter and cleaner work to boys who desire to learn a trade, and under such circumstances it is very difficult to hire boys to learn molding, and but very few of those that can be had are worth the time and trouble it requires to teach them, for the reason that the brighter and more ambitious ones have been gobbled up by those industries which have a future to offer them that is not flavored with heavy lifting, dirty clothes, ill-smelling core smoke, etc. In such cases there is nothing left for the foundryman to do but to break in laboring men to do the rough work, and when one of these men shows a desire to learn give him all the encouragement possible. Many good molders have commenced to learn the trade at the age of 30; they may have been helping in the foundry or working in the cleaning room, chipping castings, but, if they are ambitious and steady, it is a paying investment to start them to molding brake shoes or sash weights, and let them work themselves up. Such men learn very rapidly, they are old enough to realize that they have an opportunity to rise to something better than an ordinary laboring man and they will generally listen attentively to all the instructions they receive, whereas in case of a boy, he has other things to think about when out of the shop and these do not always tend to make them attentive to their own business. I have taught quite a number of men the details of the molding trade under these circumstances and have in most cases obtained very satisfactory results. I do not believe it a paying investment to be without apprentices, and if boys cannot be induced to learn the trade, green men should be broken in. A shop that is depending upon full-fledged molders to make their castings, and never tries to teach any one the trade, is obliged to depend upon some one else's apprentice system for their molders and they would, I think, be liable to be able to secure the services of very few men who would make their work satisfactory.

When a boy or man is taught the best methods in molding by his employer, he learns how to do the work in the same manner his employer would do it, he knows what is expected of him, and his employer knows what he can do, and where he will be of the greatest benefit to the company, whereas, in case of a molder who is a stranger and has served his apprenticeship in some other shop, he has ideas that are very different from his present employer's, his method of working is different, and if he is a man well on in years it is sometimes a hard task to teach him to work differently than he has been accustomed to.

The apprentice boy offers a problem that requires one with an unlimited amount of patience to handle it properly. Just as much harm can be done by paying them too much wages as not to pay them enough. It looks very nice on paper when we read that every apprentice boy should be given a chance to work on every job in the shop, to run the cupola, make cores, etc., but in real life it is a different matter. If a boy is bright and learns rapidly he should be encouraged, but great care should be taken as to the manner in which this is done. I do not consider it the best policy to let him know that he is, in the eyes of his employer, a little better than the average boy; such things spoil him, just as it does a pretty girl to be told that she is good looking. I have had considerable experience along this line (with boys, I mean) and have spoiled many by increasing their wages and causing them to know that they were better than others.

What should be done is to give this young man good work and make him feel at all times he has much to learn. I have in mind a young man who had worked for me learning the trade for one year, being paid the sum of $1.00 per day; at the close of the year, or nearly so, he came to me and asked for a raise and I gave him $1.25 per day; a few weeks afterwards I had an order come in for some small castings that required to be very nice, and thinking it would be an encouragement to this boy I gave them to him to make, piece work. I paid him a price that would enable him to make from $2.00 to $2.50 per day; he ran the job out in about one month, and two months from the date that he had asked for and received the raise in wages from $1.00 to $1.25 he came to me again and asked for more. I told him I had just raised his wages. He said, "Yes, but I have made over $2.00 a day while on piece work and did not have to work near as hard," which I suppose was true. I asked him if he did not realize that he had received a very

good price for his piece work job, etc. He did not look at it in that light, but on the other hand had concluded that he had been receiving very poor pay for his work prior to the time when he made piece work. Well I did not give him the raise, he quit, and although I lost a boy that would have made a good molder, I learned something that was worth considerable to me. I have known many instances resembling the above and I do not blame the boys, but rather the foreman. Much can be accomplished with apprentices when the foreman takes an interest in the work. Many foremen do not like to be bothered with the task of teaching boys when it is to their interest that they should. Let a good foreman start five or ten boys in his foundry as apprentices and give them personal attention and have patience in teaching them the many details in molding; in less than two years' time he will be rewarded by having in his employ five or ten men who will work after his ideas. By giving them personal attention, I mean for the foreman to show them himself how to set a core, how to cut a gate, to ram a cope, etc. The careless foreman will put the so-called "cub" with some journeyman and tell him to help him along. The man that he works with will teach him enough so he will be a help to him on his job, but when it comes to telling him why things are done and what would be the result if it was not done in the same manner, why that is the farthest thing from his mind.

One thing the older men in the shop will always make it a point to instill in the mind of the young man is, not to produce too much, for this reason if no other, it is essential that the foreman should give the apprentice his personal attention. It is often very discouraging to worry and explain and go over the same work with a boy every day and get him fairly started and then lose him, but all that can be done is to get another and go over the same ground. Some favor the method of holding back a certain amount of the boy's wages until he has served four years, and at the end of the four years pay the amount due over to him, this has, in the past, been the cause of many lawsuits; the apprentice will work until the four years have nearly expired and on some sudden impulse will call for his time, and demand the back pay, if the firm sees fit to keep it from him they have a fight on their hands.

I think the best policy is to teach all who desire to learn the trade, be it men or boys. Home made molders are the best, but such men can be developed satisfactorily only by earnest and diligent effort of the foundry foreman.

P. R. RAMP.

Another Idea.

Light, ornamental castings, such as are usually made from Britannia metal or other alloys, mainly composed of tin and lead, are sometimes cast into very light and highly decorated shapes. Geo. H. Brabrook, of Taunton, Mass., claims that the proper application of stearic acid to the surface of the mold will increase the fluidity of the metal and cause such castings to come out sharper than they otherwise would. Usually the molds employed for this class of castings are used over and over again. The inventor says that by slightly warming the parts of the mold and then applying the acid to its surfaces with which the metal comes in contact that several molds may be cast before it is necessary to apply a fresh coating.

New Steel Casting Process.

There is no doubt that many attempts have been made to devise a means for producing steel castings by cheaper and more popular methods than are now in vogue. Every little while we hear of some inventor who has gotten up a steel casting process which is going to revolutionize things in general, yet we have so far heard of none of these as being a success. An English journal has evidently caught hold of one of these wonderful inventions when it says that "A short time ago a process was patented in America which, judging from the practical results already obtained, is bound to introduce the making of steel castings into every iron foundry. This process is so simple that any foundryman can master it easily. The first cost of installation is not any higher than that of a common iron foundry, and the cost of the finished product is considerably lower than that of any known steel casting, be it crucible, open hearth, or Bessemer steel. It is even possible that every iron foundry can make steel castings by this process without altering in the slightest degree the present installation. This American inventor has succeeded in melting steel and wrought scrap in a common cupola, simply by altering the shape of the lining somewhat. The molten steel has such a high temperature that even the smallest pieces can be cast without a flaw. The steel leaves the cupola extremely hot and fluid so that a casting as thin as one-tenth of an inch can

be made. The fuel used is coke, and only 20 to 25 per cent of it is required, according to the inventor's statement, to melt the scrap. Castings of any weight can be made, just as in the common foundry practice. By mixing scrap of different hardness, castings of the required hardness can be easily obtained. The castings show great ductility, and can be forged very easily. The surface is smooth and clean. The castings may be annealed or left as they come out of the sand. The annealing, which takes from two to three days, improves the castings very much, as they lose a large percentage of carbon by it. Annealed castings can be forged and machined very easily."

This inventor claims too much, and the fact that his name is not given, nor known for that matter, lends strength to the opinion that this is only another pipe story which has been taken too seriously.

A Few Rules for Casting Aluminum.

Pour this metal as cold as possible. Of course, thin castings have to be poured hotter than those of heavier section but, on general principles, this rule holds good in all cases. A convenient way of ascertaining the temperature of the metal is as follows: If its color is red stir with a pig of aluminum until it is white. The melting of the pig will serve as a guide so far. Then dip the end of a cold pig three-quarters of an inch or so into the metal, the aluminum will chill around the pig and when the latter is withdrawn from the melted metal remains like a little cup on the surface of the metal. The time required for this chilled metal to melt gives a good idea of the temperature of the metal in the crucible.

Use sand as dry as possible, and avoid sponging a mold. A little filing on the casting where the mold tears up is more to be preferred than a lost casting. Small bodies of sand nearly surrounded by metal, such as the center cores of small set collars, are almost certain to blow if the sand is a little damp.

Use large sprues and heavy gates. In some cases, however, it will not do to put a large gate on a thin casting as the gate sometimes draws from the casting.

Pour rapidly. Just "dump" the metal in. Aluminum is not as liable to wash away portions of the mold as other metals on account of its lightness.

Ram the molds very softly. It is not necessary to ram these nearly as hard as for iron, as aluminum is but one-third as heavy. Soft ramming will very often prevent the breakage of castings when they "set." The reason for this is that aluminum, just after it solidifies, is very weak and crumbly and will scarcely bear its own weight.

Vent all molds well.

Generally speaking, cut the gate into the heaviest part of the casting. Top gates are often best. Many castings for patterns, such as pulleys, can be top-gated into the center core prints. Very often it becomes necessary to use risers to feed the heavy parts of the castings. An observance of the rules here enumerated will generally insure sound castings.

HARLAND TUTTLE.

The Krank's Corner.

My friend, Walter J. May, has written up some more of his interesting experiences with the foundry business. This time he takes up the molding of internal screw threads, of which he says:

"For rough, cheap work, and occasionally for jobbing work, it is necessary to cast the thread to receive a screw with decent accuracy, and this is fairly easy to do in two or three ways, if care be taken. Of course, it is better and more accurate to cut the threads mechanically; but this involves a cost which cannot be borne by many things—cheap mangles, for instance. Usually for such work a clean and well-cast thread is sufficient.

"The best method is to have proper core boxes made, making due allowance for shrinkage, and having the box in three or four parts, so that the core can be taken out without damaging the thread. If the core is well coated with plumbago it will leave a clean thread and require no dressing, but of course the core must be well made. Or, if preferred, a screw can be used instead of a core, and with a little careful handling this works very well. All that has to be done in such a case is to coat the screw with an evenly-applied coating of plumbago mixed with a little gum to make it adhere, and of sufficient thickness to allow for the contraction of the metal; then with a little humoring the screw comes out all right, especially if some paraffine has been soaked into the plumbago in the casting. For single castings, or for occasional brass or gun-metal nuts, this answers very well, but of course the method is not so good as that of having proper cores.

"The writer once had a job brought in, which was light enough, and some wooden

screws about ⅜ in. in diameter were brought as cores, these having been soaked in some compound to make them non-flammable. They answered fairly well, but except for thin work which sets rapidly they could not be depended on.

"Plaster and sand cores, if well vented and blacked, do very well, but these require molds or core boxes to form them, and unless there is a fairly thin casting they are not so good as a well-made sand core. Still, as they are easily made they answer for many purposes."

* * * * *

Casting screw threads instead of having these cut in the machine shop can only be defended on the plea of economy, and more than once it has cost ten times more to cast an inferior thread than it would to have hauled the casting over to the machinist and let him have made a decent job of it. The making of a core for a screw thread may seem easy enough, on paper, but let one try it, and he is likely to conclude that this kind of a hole is a job that had better be left to the machinist. Mr. May's idea of coating a screw with plumbago and then withdrawing it from the casting through a little humoring sounds all right, but the chances are that the machinist will cut the threads while Mr. May is making the screw humorous enough to leave the casting. It would also be interesting to know by what process of reasoning it was thought cheaper to turn up wooden screws to be used for coring threads instead of letting the machinist cut the thread in the first place. Then again to have melted iron lay gently against wood without burning the latter is a new trick in foundry practice of which we should like to learn more.

* * * * *

Every little while people who are about to start some kind of a foundry will ask all sorts of questions as to how they should proceed. It is nothing unusual to receive inquiries of such a length that it would require a month's time for a mechanical engineer to answer them in full. *The Ironmonger*, London, England, was recently asked by one of its subscribers to furnish an estimate of the cost of a foundry capable of turning out five tons of light castings per week, and we reproduce the carefully prepared answer of our contemporary as a matter of general interest. If the reader will remember that a pound sterling very nearly equals five dollars, he can easily compare the prices given with those prevailing here. *The Ironmonger's* reply reads:

"It is difficult to advise on the data supplied, but we will endeavor to indicate the lines we think subscriber might follow. *General Arrangement*: Assuming that the ground plan is rectangular, we should divide it into three sections—one for the foundry proper, being the greatest part, one for the fettling shop, and a third and smallest for the core oven. The cupola may be at the same end as the fettling-shop, or at the opposite end if that is more convenient, but the cupola must be fixed so that the least possible handling of pig, scrap and coke is involved. If the space is available, it should be arranged so that the raw material may be placed on the cupola platform in barrows, either by wheeling or a lift, to avoid the loss of time arising from hand or shovel work. The figures given below can but be approximate, but they may assist in forming an estimate. Starting with the raw material sheds, allow 10*l.* to 15*l.* for staking out and covering in three rough bays respectively for sand, coke and pig iron. The scrap will not hurt if it is exposed to the weather. Say 5*l.* to 10*l.* for a cupola platform. *Cupola.*—Five tons per week means probably two casts per week, and a 30-cwt. per hour cupola would meet the case, such a one listing at about 55*l.* Our inquirer might reduce his first outlay here by buying an old Lancashire boiler-shell and building his own, but it is questionable whether in the long run he would save anything. *Crane.*—A light overhead traveler is undoubtedly the handiest form, the alternative being a jib, which we strongly advise should be fixed to swing over either a half-circle from one side or, if near the end of the shop, over about two-thirds of a circle. Do not fix it in the *center* of the shop. It is not possible to give even an approximate cost here. *Boxes.*—Our subscriber would probably find it cheapest to make his patterns—assuming he has a wood-working department—and then ask, or advertise, for quotations for the castings, either rough or fitted. As we have not the least idea how many or how large boxes will be wanted, we cannot put a price, but we expect that about 7*l.* rough or 10*l.* fitted per ton would cover if a fair quantity were ordered. *Ladles.*—Five pounds spent on two each 30-lb., 40-lb., 60-lb. hand-ladles, and one double shank to hold about 1½ cwt., might suffice for a start. *Sundries.*—About

5*l.* to 10*l.* would cover the loose tools, such as sieves, barrows, buckets, shovels, water ing-cans, bot-irons, rammers, drawing-bars for clearing the cupola, etc. *Sand.*—Half a cubic yard of sand per square yard of foundry floor would probably be a fair amount to start with. This means 18 inches of sand thickness if it is all spread. We are sorry that we cannot say which market for this commodity is best suited for the questioner's district; nor can we estimate the price per ton. *Brass-founding.*—Subscriber will probably need a brass-furnace, which might be a brick one for coke, or a self-contained oil-heated one. Probably 15*l.* spent here would cover cost of furnace and a first stock of crucibles. *Molding-machines.*—We think that if there is much repetition work one or more molding-machines, costing about 25*l.* each, would be desirable; and a not inconsiderable sum would be involved in the production of pattern-plates, whether machine or bench molding for small articles was adopted. *Benches.*—Allow, say, 5*l.* to 10*l.* for benches along the side opposite to the crane, or as convenient. *Blower and Pipes.*—About 40*l.*, we think, will not be too much to allow for a blower of suitable size and the necessary pipes, valves and connectors. *Other Machines.*—If they can be afforded, a sand-grinder and mixer and a rotary sieve are useful adjuncts, but neither is absolutely necessary at the outset. *Core Ovens.*—We believe that a brick oven with an open coke fire-basket, built from the center of one side, is a convenient form. Hinged or sliding doors of plate iron will be essential, and it is an economical plan to fix a supplementary metal-cased oven within the larger one. Small cores will dry in this when the big stove is on; or, if only small cores are wanted, a small fire beneath it will do what is wanted. Probably from 20*l.* to 30*l.* will cover the brickwork, doors, grate, iron shelves, etc., required. Length and width will be determined by the class of work, but it should not be lower than a man's standing height. *Other Requisites.*—Before starting it will be necessary to lay in a small stock of gannister for lining-up the furnace, fire-bricks, plumbago, charcoal blacking, limestone, possibly core-barrels, and a weighing-machine. *Fettling-shop.*—Probably 10*l.* to 15*l.* will be spent in bringing the shafting into the fettling-shop, and another 5*l.* to 10*l.* on benches, vises, etc.; besides which a double-ended 14-inch emery-wheel will absorb, say 15*l.* more; and to this a rattler ought certainly to be added, at a cost of, say, another 10*l.* *Power.*—We say nothing of this, as presumably our inquirer would arrange the shop to be worked in conjunction with the rest of his departments.

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One often wonders why some concerns should be satisfied with a word or two to complete their names and that again others should insist on having a name so lengthy that one has to dip his pen several times to complete it. For instance, Denver, Colo., boasts of a Union Foundry & Crescent Steel Range Works, and why shouldn't all mail matter reach these people if this name was reduced by half? Batavia, Ill., has its Challenge Wind Mill & Feed Mill Co.; why wouldn't the Challenge Mill Co. sound as well? Parson's Band Cutter & Self Feeder Co., of Newton, Iowa, would tickle several of its correspondents if it would cut the band of its own name. The Webster City (Iowa) Hot Water Heating Co. would look as pretty as the Webster Heating Co. The United States Cast Iron Pipe & Foundry Co. is a big concern, which, perhaps, would do as much business with a shorter name. The Camden Anchor Rockland Machine Co., of Rockland, Me., could condense its name without losing its identity. Massachusetts has its Bridgewater Foundry, Machine & Rolling Mill Co. The Christopher & Simpson Architectural Iron & Foundry Co. hails from St. Louis. The Uneeda Tool & Machine Co., of Martin's Ferry, Ohio, adopts the much-used word coined for the cracker trust. The I. X. L. Steel Overshoot Water Wheel Co. is a product of Hanover, Pa. The American Safety Lamp & Mine Supply Co. belongs to Scranton, Pa. Hunter's Farmers' Friend Plow Works has its home in Fredericksburg, Va.

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I have previously said something to the effect that foundrymen do not know how to advertise their business. The way things look I will have to take this back at an early date.

Here comes George S. Carter, of New Britain, Conn., with a circular bearing the emblem of good luck, and proceeds to tell us what he can do in the line of casting copper, aluminum and kindred alloys. The fact that he found this brass foundry should not count against him. Probably he couldn't help but find it, although property is supposed to be better taken care of in the New England States. This is a reduced copy of his opening announcement:

P. O. BOX. 912. TELEGRAPH. TELEPHONE. 297-2.
CORNER WASHINGTON AND LAKE STREETS.

Who has found a Brass Foundry, corner Washington and Lake streets, New Britain, Conn. On and after Thursday, December 19, call, write, telephone, telegraph for prices for castings made from the following metals:

Aluminum,	Bronze,	Brass,	Babbitt,
Bearing Metal,	Copper,	Chicago White Metal,	
Composition.	Carter Metal,	Phosphor Bronze,	
	and Gun Metal.		

Having worked seven million, one thousand, two hundred and eighty minutes in the brass foundry business, and employing none but strictly temperate and first class workmen, he feels warranted in saying that he can guarantee all castings to be first class in every respect. All patterns will be placed in a fire proof vault at night, locked with a Corbin Cabinet Lock Co.'s lock, which, with his Chicago White Metal, Philadelphia & Reading Railroad Bearing Metal and Birmingham Babbitt Metal cannot be beat in the U. S. A. or any other country.

If you come to New Britain by steam or third rail cars go up the track to Lake street five minutes' walk. Keep off the third rail. If you come by trolley get off W Main street car at Washington, go north to Lake three minutes' walk.

Respectfully,

GEO. S. CARTER.

To save the reader some time I would say that I find that all of the million minutes mentioned by Mr. Carter amount to nearly thirty-nine years, counting ten hours as constituting a day's work. This apprenticeship should have made him a full-fledged journeyman and he talks as if he had confidence in himself.

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It seems that W. G. Irwin, the same one who advocated the use of cow hair in facing sand had one of his literary gems accepted by the *Coal Trade Journal*, as a Cincinnati coal and coke company quotes some of the wise things he is noted to produce spasmodically. In this case Mr. Irwin repeats that baldheaded yarn from Hannibal, Mo., wherein a foundry is given credit for melting 13,100 pounds of iron with 680 pounds of coke. To people who have cupolas of their own and know something about melting it is scarcely necessary to say that all of the 680 pounds of coke would be required for a bed, and that the whole story of this performance is one of the jokes which are taken too seriously. Evidently W. G. Irwin is unable to see the point of anything humorous relating to the foundry business, for he goes the story teller from Missouri one better, in the following: "Of course the quantity of coke required for any special foundry purpose will vary from other foundry uses of the fuel. For high carbon steel about 650 pounds of coke to the ton of metal is required, while with scrap iron and hematite pig combined in equal parts from 90 to 110 pounds of coke to the ton is required. However, in ordinary every day foundry operations about 160 pounds of coke of a fair quality is required to the ton of metal melted. In all furnace or foundry operations there is more or less waste and this applies to fuel as well as to other materials." Someone ought to have this man Irwin examined as to his sanity. If he ever melted a ton of any kind of iron with ninety pounds of coke, this took place in his dreams.

Opening in the Latest Style.

A German Count and a Prussian Baron were among the distinguished guests at the novel opening of an iron foundry by Herman Broesel, a wealthy New York broker at New Brunswick. Mr. Broesel recently purchased the New Brunswick Iron Foundry and changed the name to the Empire Iron Foundry. Count von Salzbach Kluge, of the German Guards, and Baron Albert von Schroeder, of the Prussian Cuirassiers, were among the guests, with Mayor George A. Weihmann and others of the city officers. Iron trinkets, cast before their eyes, were given to the guests for souvenirs.—*Exchange.*

There is Hustling at Newark.

The brass foundry was as cold as a barn this morning, and everybody had an extra hustle on, trying to keep warm. Molder George Stoltz, who was sick Saturday, is well and is hustling to make up for lost time.—*Newark (Ohio) Tribune.*

Deaths.

Nathaniel E. Russell, formerly general manager of the Walter A. Wood Mowing & Reaping Machine Company, died January 16, at Troy, N. Y.

Charles Paxton Williamson, a pioneer iron

maker of Birmingham, Ala., died on January 20, aged 59 years. He was a native of New Richmond, Ohio. Mr. Williamson went to Birmingham in 1874 and was one of the organizers of the Linn Iron Works, one of the largest foundries in the city. In 1885 he was the prime mover in the organization of the Williamson Iron Co. and built the Williamson Furnace. At the time of his death Mr. Williamson was president of the Williamson Iron Co.

Oscar M. Burke, one of the oldest and most prominent residents of Cleveland, Ohio, died February 4, aged 79 years. Mr. Burke was best known as one of the founders of the Lake Shore Foundry, now one of the branches of the United States Cast Iron Pipe & Foundry Co., of which his son, Clarence E. Burke, was one of the organizers.

William Hopkins, vice-president and superintendent of the Iowa Iron Works, Dubuque, Ia., died February 5, aged 61.

Chas. L. Chapman, chief owner of the Pittsburg Foundry & Machine Co., with plants at Pittsburg, and Iola, Kans., was killed at a railroad crossing near Fort Scott, Kans., January 15.

Christopher Emrich, one of the oldest stove manufacturers in Ohio, died at his home in Columbus recently, aged 74. He was born in Bavaria, Germany, and came to this country at the age of 12, when he learned the molder's trade. He began the manufacture of stoves on his own account, in 1861.

Charles Pemberton Deane, one of the organizers of the Deane Steam Pump Co., of Holyoke, Mass., now a branch of the International Steam Pump Co., died in Springfield, Mass., recently, aged 57.

John Dixon Graff, late manager of the Pittsburg Stove & Range Co., died in Monongahela City, Pa., January 28, aged 37. He was the eldest son of Thomas J. Graff, one of Pittsburg's pioneer stove makers.

Ely Ensign, district manager of the American Car & Foundry Co., died in Huntington, W. Va., January 27, aged 61. He established the Ensign Car Works in 1872.

Frederick Jarecki, for many years superintendent of the brass foundry department of the Jarecki Mfg. Co., at Erie, Pa., died February 6, aged 70.

R. Galbraith, one of the best known foundrymen in the West of Scotland, died recently at Paisley, Scotland. For the last ten years he had been in charge of the foundry of A. F. Craig.

Among the Foundries.

A new steel casting plant has been projected at Matthews, Ind. The Matthews Steel Casting Co., organized with a capital stock of $50,000, proposes to erect an open hearth steel works. The incorporators are John Clifton, George N. Catterson and John H. Wood.

The International Steam Pump Co. will double the capacity of the Snow plant, located at Buffalo, N. Y. Additional ground has been purchased on which will be erected three new buildings, a foundry 132x450, a machine shop 100x450, and an additional office building 75x100 feet. Approximately the cost will be $500,000. The American Bridge Co. has been awarded the contract for the foundry.

The F. R. Patch Mfg. Co., of Rutland, Vt., is extending its foundry by a one story addition 55x82 feet in size.

The Garden City Fan Co., of Chicago, has purchased a site at Niles, Mich., and intends to remove its works to that place at an early date.

H. D. Reynolds has been appointed receiver of the Enterprise Foundry Co., of Bristol, Tenn.

The American Foundry & Machine Co. is building a new plant at Ravenna, Ohio. This concern is a reorganization of the Lane & Wallace Engineering Co., which was formed a short time ago at Cleveland, Ohio. The firm's specialty will be mining machinery.

The Center Foundry & Machine Co., Wheeling, W. Va., for manufacturing castings and machinery of all kinds, has been chartered with an authorized capital of $50,000.

Among the new shops being built by the American Machine Co., of Louisville, Ky., is a foundry 40x150 feet.

Lewis Shallcross has purchased the entire stock of the Wissinoming Brass Foundry Co., Philadelphia, and will continue the operation of the plant.

The Novelty Stove & Mfg. Co., of Savannah, Mo., has increased its capital stock to $50,000.

The William Bros Boiler & Mfg. Co. has been incorporated at Minneapolis, Minn., with a capital stock of $300,000. A new manufacturing plant is now being constructed and this will include a foundry 300x112 feet, for the erection of which the Modern Steel Structural Co., of Waukesha, Wis., has the contract.

The Youngstown (Ohio) Steel Casting Co. has increased its capital stock to $100,000.

The Menefee Foundry Co., recently incorporated at Ft. Wayne, Ind., with a capital of

$20,000, succeeds to the business heretofore carried on by Chas. M. Menefee.

The H. B. Sherman Mfg. Co., of Battle Creek, Mich., has purchased the Acme Brass Works at Elkhart, Ind., and will remove the entire business to the Michigan plant.

Frank Champe, of Dublin, Ind., will build a foundry at Cambridge City, Ind.

E. R. Caldwell & Co., of Bradford, Pa., have had plans prepared, which if carried out will double the capacity of their present equipment. A new foundry is included.

The Keystone Bronze Co., of Pittsburg, will build a new foundry.

The Sharon Foundry Co. has been organized at Sharon, Pa., with a capital stock of $250,000. The leading parties in the new concern are James P. Whitla, of the Sharon Steel Co.; Joseph Biddle and W. W. Shilling, of the Sharon Boiler Co.

The Youngstown (Ohio) Car Mfg. Co. is winding up its affairs and will retire from business permanently.

The Brillion (Wis.) Iron Works has been incorporated with a capital of $25,000 by Henry Clisens, John Thompson and Joseph Wolfinger.

The Norwalk (Conn.) Brass Co. will increase the capacity of its foundry.

The South St. Louis Foundry, of St. Louis, Mo., has incorporated with a capital stock of $100,000.

The Hewitt Mfg. Co., of Chicago, a branch of the Magnus Metal Co., is having plans prepared for a large manufacturing plant to be located at Fortieth-street and Emerald avenue. A brass foundry 150x250 feet is contemplated.

J. L. Faulhaber has purchased the Globe Foundry at Fostoria, Ohio.

The Riverside (Cal.) Iron Works is building a new plant.

The Sharp-Bolter Co. has been formed at Omaha, Neb., to conduct a foundry. L. C. Sharp and C. R. Bolter are the organizers.

The Deming Co., of Salem, Ohio, has under consideration plans for increasing the capacity of its plant. An extensive addition to the foundry is provided for.

The plant of the Meriden Malleable Iron Co., Meriden, Conn., which has been idle for several months, has been leased by the Charles Parker Co. and again placed in operation.

Alfred J. Carr has been appointed receiver for the Baltimore Foundry Co., Baltimore, Md.

John Anderson will conduct a foundry and machine shop business at Sedro-Woolley, Wash.

Robert McMillen has been appointed receiver for the Phœnix Foundry Co., of Pittsburg, Pa.

The Hunt Foundry & Machine Co., recently incorporated with a capital stock of $100,000, all of which has been subscribed, is a consolidation of the Hunt Air Brake Co., and the Kensington Foundry, of New Kensington, Pa. The new company will manufacture the same line as heretofore made by the Hunt Co., street car brakes, portable and stationary air compressors, and small refrigerating plants, to which will be added brass and iron castings.

The Schiller Piano Co., of Oregon, Ill., has in view the installation of a foundry department to do its own casting. A machine shop and plating outfit are also to be added.

The Chrome Steel Works, of Brooklyn, N. Y., have decided to remove their plant to Carteret, N. J.

The Cresswell & Waters Co., of Philadelphia, Pa., was recently formed by the consolidation of the David S. Cresswell and the Goodell & Waters iron foundries and was incorporated with a capitalization of $250,000. Both foundries are well known to the trade, the former having been formed in 1840 and the latter in 1860.

The foundry of the Tacony Iron Works, Philadelphia, after being idle for some time, has resumed operations.

The Sciple Pump Co., of Philadelphia, has purchased the machine shops and foundry at Seneca Falls, N. Y., lately occupied by Gleason & Bailey and will place the same in operation. Frank C. Beebe will be in charge of the plant.

The National Tool & Machine Co. and the Central Foundry & Machine Co., Reading, Pa., have consolidated under the name of the latter. The plant of the National Company will be combined with that of the Central Company, which is being extensively enlarged. The capital stock has recently been increased from $7,000 to $18,000.

The Detroit Steel Casting Co., recently incorporated at Detroit, Mich., succeeds to the steel casting business formerly carried on by the Detroit Steel & Spring Co.

Pierpont & Heaton, of Provo City, Utah, will build a new foundry.

The Hathorn Foundry & Machine Co. has been incorporated to do business at Mason City, Iowa.

Theodore Johnson is building a foundry and machine shop at Oconomowoc, Wis.

The Newport News Shipbuilding & Dry Dock Co., Newport News, Va., have purchased the Caskey foundry, which they will operate as one of the departments of their yard. They

expect to have it running within a few weeks.

The E. & G. Brooke Iron Co., Birdsboro, Pa., are to build a steel foundry, 248x220 feet, with an addition of 62x140 feet. The plans are being made by S. V. Huber & Co., of Pittsburg.

The Central Iron Works, of Quincy, Ill., have under consideration the building of an addition to their foundry.

The McKees Rocks Mfg. & Foundry Co. has been organized at McKees Rocks, Pa., with a capital of $50,000. A. C. Uhl will be manager of the plant.

The Oswego Boiler Works, of Oswego, N. Y., are building an extension to their plant which will be used for the manufacture of steam radiators.

S. B. Patch & Sons, of Streator, Ill., are installing some new equipment with a view of increasing the output of their foundry.

The Montpelier (Ohio) Foundry & Furnace Co., is building a new foundry.

The Osborn Engineering Co., of Cleveland, Ohio, has prepared plans for the new works of Kenney & Co., of Scottdale, Pa., which will include foundry, machine and pattern shops.

The American Car & Foundry Co., will increase its foundry at Huntington, W. Va.

The McClary Mfg. Co., of London, Ont., will have a branch works at Hamilton, Ont., which will be given up to the making of furnaces.

The business heretofore carried on under the name of Beaumier Bros. & Co. at Brenham, Tex., will in the future be conducted by J. Beaumier as sole proprietor.

The Michigan Malleable Iron Co., of Delray, Mich., will extend its plant to take care of increasing trade.

Hooven, Owens & Rentschler, of Hamilton, Ohio, will erect new works at that place which, when finished, will make them one of the most complete engine building establishments in the country. The foundry will occupy a space of 111x408 feet and is to be provided with the best of equipment for the turning out of heavy castings.

The malleable department of the American Car & Foundry Co., at Madison, Ill., which was built four years ago, but has only been operated at intervals, will shortly resume operations.

The National Sash Weight Manufacturers' Association recently elected the following officers: President, Martin Andrews, of Chicago; vice-president, E. E. Brown, of Philadelphia; secretary and treasurer, J. C. Brainard, of Cleveland; directors, B. F. Fry, of Waterbury, Conn.; J. E. Price, of Chattanooga; E. Over, of Indianapolis.

The Modern Iron Works, recently organized at Quincy, Ill., have purchased the Smith-Hill plant in that city. The manufacture of plumbers' supplies will be one of the chief specialties. The officers are: E. L. Walcott, president; A. J. Niemeyer, vice-president; R. Vernon Clark, secretary and treasurer.

The Wilkes Foundry Co., of Toledo, Ohio, have incorporated with $25,000 capital stock, by Charles T. Wilkes, Thomas Davies, Wm. E. Brown, George M. Kinney, and M. J. Riggs. Plans for a foundry building 400x300 feet have been completed. Erection of the plant will start at once, and the company expect to have it in operation by May 1. The equipment will be very complete, and castings of all kinds will be produced.

The Browning Engineering Co., of Cleveland, who erected a large plant near Collinwood last summer, are contemplating increasing their facilities by the erection of a large foundry.

The Leighton & Howard Steel Co., of East St. Louis, Ill., succeeds to the business formerly conducted under the name of the Shickle, Harrison & Howard Iron Co.

J. H. Kelly and L. C. Linton will establish a brass foundry at Mt. Gilead, Ohio.

A consolidation of the Ramapo Foundry Co., of Mahwah, N. J., and the iron foundry branch of the Sargent Co., of Chicago, has been effected. The new company have been named the American Brake Shoe & Foundry Co. They are capitalized at $3,000,000. Following are the officers of the new company: W. W. Snow, chairman of the board; W. D. Sargent, president; O. H. Cutler, vice-president and general manager; R. J. Davidson, secretary; H. K. Gilbert, treasurer; E. J. Snow, assistant treasurer.

The New Albany Stove & Foundry Co. succeeds the Acme Fence & Foundry Co., of New Albany, Ind. The capital stock will be increased to $15,000. The new concern will not engage in the making of stoves but will make a specialty of furnishing castings for manufacturers of such who have no foundries of their own.

The Cherokee Foundry & Machine Co. has been organized with a capital of $20,000, to do business at Cherokee, Kans.

The Dempster Mfg. Co., of Des Moines, Ia., has increased its capital stock to $150,000, and has in view the enlargement of its plant.

The Union Steam Pump Co., of Battle

Creek, Mich, is planning the erection of a steel frame foundry 90x80 feet and a two-story machine shop 50x150 feet. A fire proof pattern house 40x50 feet is also to be built.

The John Abell Engine & Machine Co., of Toronto, Ont., has been incorporated with a capital of $1,000,000.

The Battle Creek Foundry & Machine Co. has been organized at Battle Creek, Mich., with a capital of $40,000. The company intend to pay special attention to heavy work and will equip the plant with latest improved machinery adapted to that class of work. The officers are: President, Frank E. Halladay · secretary, Walter H. North; treasurer, A. M. Slay; business manager, Joseph H. Fillingham.

The Fountain City Drill Co., of La Crosse, Wis., will build an addition to its foundry early in the spring.

The Cuyahoga Stove Repair Co., of Cleveland, Ohio, has purchased a tract of land on which a foundry 100x125 feet will be built.

The Ferris Clevis Co., of Oshkosh, Wis., are considering the building of a medium sized malleable plant in order to supply itself with castings.

B. F. Ogden has purchased the Freeman foundry at Louisiana, Mo., which has been idle for a long time, and will place the same in operation just as soon as it can be overhauled and the necessary equipment provided.

N. L. Rundio, of Williamsport, Pa., is having plans prepared for a new foundry.

The Globe Stove Mfg. Co., has been incorporated to do business at San Francisco, Cal.

Alvin Kendall has purchased the old Rennaker foundry at Converse, Ind., and will put the plant in operation at an early date.

Work will commence on the new foundry to be built by Charles Clarage, at Kalamazoo, Mich., at an early date. It will be 70x150 feet in size.

The Cannon Metal Wheel Works will build a foundry at Pontiac, Mich. They are now occupying leased quarters.

Kemp & Foulk have secured the foundry heretofore operated by Frank Stutzman at Williamsport, Pa.

The Duncan Meter Co. will locate their plant at Lafayette, Ind. A brass foundry will be included.

The Griffin Wheel Co. is preparing to enlarge its plant at Overland, Colo.

The Nazareth Foundry & Machine Co., of Nazareth, Pa., whose plant was completed but a short time ago, are contemplating an extension of their foundry. R. J. Kellogg is superintendent and manager.

The Cambridge Foundry Co. and the Cambridge Mining Car Co., of Cambridge, O., will be consolidated and a large plant will be erected in that place for the production of both lines.

The Coe Mfg. Co., of Painesville, Ohio, heretofore a partnership company, have been reorganized and incorporated with a $125,000 capital stock. H. H. Coe is president; H. P. Coe, vice-president; Frank Morey, secretary. The company are the largest makers of veneer machinery in the country. They have just completed a new plant, and will add new machinery to increase the capacity.

The Jeanesville Iron Works Co., Jeanesville, Pa., will considerably enlarge their plant and nearly double its capacity. The plans embrace a 75-foot addition to the machine shop, which will also be widened its entire length, and the rebuilding and enlarging of the foundry. In the latter a 15-ton traveling crane will be installed. The company make mine and pumping machinery.

The Foster & Brown Co., recently incorporated, are a reorganization of the firm of Brown & Foster, Westbrook, Maine, machinists and iron founders. The management will be the same as heretofore, the only change being in the name.

The James Graham Co., of Newark, Calif., are contemplating making extensive additions and improvements to their plant.

H. R. Barnhurst, for many years connected with the Erie City (Pa.) Iron Works, will have charge of the new shops now being built by the Allis-Chalmers Co., at West Allis, one of Milwaukee's suburbs.

W. R. Palmer has been appointed general manager of the Youngstown (Ohio) Steel Casting Co. Mr. Palmer was formerly connected with the American Steel & Wire Co.

The A. W. Cadman Mfg. Co., of Pittsburg, will erect a new brass foundry.

H. Lintz & Co. are preparing to build a foundry and machine shop at Fort Branch, Ind.

Richards Bros., of Knoxville, Tenn., now engaged in the manufacture of machinery and mine supplies, will add a foundry to cost $10,000.

Among other improvements contemplated by the Deere & Mansur Co., of Moline, Ill., is the erection of a new foundry, which will accommodate about 200 molders. A shop 100 x 380 ft. is planned.

The American Stove Co., of Chicago, incorporated under the laws of New Jersey with a capital stock of $5,000,000, was launched recently. Nine companies manufacturing gasoline and oil stoves, gas stoves and appliances were absorbed. They are as follows : Ringen Stove Co., St. Louis; Quick Meal Stove Co., St. Louis; George M. Clark & Co., Harvey, Ill.; Schneider & Trenkamp Co., Cleveland; the Standard Lighting Co., Cleveland; the Dangler Stove & Mfg. Co., Cleveland; the National Vapor Stove Mfg. Co., Lorain, O.; the Monarch Stove & Mfg. Co., Mansfield, O., and the Twin Burner Vapor Stove Co., St. Louis. The new company will have offices in St. Louis, Chicago and Cleveland. The officers elected are : President, C. A. Stokstrom, St. Louis, Mo.; vice-presidents, George M. Clark, Chicago; D. A. Dangler, Cleveland; F. L. Alcott, Cleveland; secretary, H. J. Trenkamp, Cleveland; treasurer, George F. Fisk.

It is reported that the Kinzer-Jones Mfg. Co., of Pittsburg, will build a new plant at Washington, Pa., and remove its works to that place.

The Brooklyn shops of Henry R. Worthington will be consolidated with the Elizabeth, N. J. works.

Reports state that the Avondale (Ala.) Stove & Foundry Co. will build a new plant in the immediate future, part of which will be set aside for the casting of hollow-ware.

The Union Pacific Railway Co. are said to contemplate the location of large shops at Pocatello, Idaho. A foundry is proposed in this connection.

The Piedmont Foundry & Machine Co., Hickory, N. C., has been incorporated with a capital of $10,000.

Fires.

The H. Wetter Mfg. Co., of Memphis, Tenn., one of the largest stove foundries in the South, suffered the loss of its plant through fire January 20.

The Wireton Heating Co., of Blue Island, Ill., had its foundry wrecked by fire February 6. It is reported that the concern will rebuild at Hammond, Ind.

The Dauchy Iron Works, 84 to 90 Illinois street, Chicago, architectural foundrymen, suffered the loss of their plant by fire on January 30. The loss was $14,000, covered by insurance.

The plant of the St. Louis Iron & Steel Foundry Co., at St. Louis, Mo., burned January 16. It will be rebuilt immediately.

The Springfield Foundry Co., and the Progress Stove & Furnace Co., were both burned out in the big fire at Springfield, Ohio, February 10, which destroyed the mammoth plant originally occupied by the Whiteley shops.

The Wallace Mfg. Co., of Frankfort, Ind., had their plant damaged by fire February 3.

The Allston Foundry Co., of Boston, Mass., suffered the loss of their plant by fire January 27. The loss is estimated at $10,000.

A fire destroyed the foundry and pattern department of the Racine Boat Mfg. Co., at Racine, Wis., February 13, causing a loss of $4,000.

The foundry of Kelly & Taneyhill, at Waterloo, Ia., burned January 14, entailing a loss of $4,000. Insurance $2,000.

The pattern department of the Dobbie Foundry & Machine Co., at Niagara Falls, N. Y., was scorched in a blaze January 15.

The foundry operated by W. A. Preston, at Grinnell, Ia., burned January 18. It will be rebuilt at once.

Fire did a damage of $5,000 to the plant of the Anderson (Ind.) Malleable Iron & Mfg. Co. January 20.

A fire at the Ashland Iron Works, Ashland, Ore., did considerable damage January 25. Fully insured.

Hugh Davitt's foundry, at Springfield, Mass., was damaged by fire February 11.

Fluxes in the Foundry.

At the Buffalo Convention of the American Foundrymen's Association, P. Longmuir, in a paper dealing with the laboratory as related to the foundry, expressed himself as follows: "The days of special fluxes, fakes, and nostrums of various kinds are surely drawing to a close, and what we need in this twentieth century is clear light, with definite and exact methods. There is no flux known that will remove the uncertainty of foundry work." Referring to this a contributor to the *Mechanical World* writes as follows:

"No doubt Mr. Longmuir has his ideas on the matter, and certainly I have mine. And I will go beyond him, and most emphatically assert that there is not a chemist yet born who can run a foundry with uniformly satisfactory results unless he has good materials to work with, and knows how to practically deal with them. Given skilled workmen and good material, there is no necessity to use any flux whatever with iron. But you cannot turn out good work with the rubbish served out in many

places; hence the 'uncertainty' of much of the work in ordinary foundry practice. You want plumbago, and you get plumbago and other things, because, forsooth, it saves 1s. per hundredweight! You want soft iron, and you must use what is in stock and 'throw in those old firebars, to get rid of them'; and if you want coke, you must take what is provided, because 'it is cheap.' And no amount of analysis will get over this.

"Coming purely to the question of fluxes, there are usually alloys such as ferro-aluminum or combinations of chemical salts which to some extent alloy with the metals, or which by their action form combinations with matters in the metal which it is desirable to remove. Say you have to use scrap metal carrying paint, and that you have to deal with a coke carrying an excess of sulphur; how does this affect the iron? You have to use them, anyhow, and unless you carry a high temperature in your furnace, they show rather marked results; but if given to you, they have to be used, and if by fluxing you can reduce their effect, so much the better; but you do not want chimerical 'fakes' for the purpose.

"Taking a substance much used in foundries for fluxing—10 per cent ferro-aluminum, —we are told to use from 2 to 4 oz. per 1 cwt. of iron Now assuming that we use 4 oz., we have a total of 1750 grs., of which 175 are aluminum, if the sample contains 10 per cent Al (a matter which cannot always be relied on), and these 75 grs. have to act on 785,575 grs. (1 cwt. + 3.6 oz.) of iron and other things, and the aluminum in such case stands as 1 to 4489. Yet no doubt Mr. Longmuir will say that this is not a flux, but an alloy, although he would not find it in the casting probably, as it would have done its work and slagged off as alumina in combination with some other content of the iron.

"Now no founder would buy ferro-aluminum except under guarantee that the bulk gave 10 per cent Al. But can anyone, chemist or otherwise, always find 10 per cent Al in a 4 oz. sample; or if picked pieces are taken, can he guarantee to find even 4 per cent Al? At the same time the effect of this flux is quite well marked, as everyone using it will be ready to admit, and no one would call it other than a flux.

"Again, fluorspar is, or was, used for the same purpose as aluminum, and ground to a fine powder under a trade name it cost about 9 d. per pound. At about 2 d. per pound it is a cheap flux, and answers its purpose well. Then, again, another thing was put on the market at 4 d. per pound, the maximum quantity used to 1 cwt. of metal being 2 oz. This did the same amount of work as the others mentioned, but at a less cost; with dirty, sluggish scrap, the cost was only ½ d. per cwt. But this was an altered or, say, sub-metallic form of metal, and could not be called an alloy, because if reduced to a fused metallic state in bulk it would have fired of its own initiative when in contact with the air.

"Yet while using three admittedly good materials for the treatment of iron, these fluxing agents are not supposed to do more than remove certain faults; and taking either of them, no sane person would expect it to turn white iron gray or to remove any 'uncertainties' other than the very certain objects claimed for it. Phosphorus is a far more certain thing to get graphite carbon into white iron than aluminum, if you use it rightly; and probably in a well-managed furnace, ferro-silicon would give better results. But why not use gray iron at first?

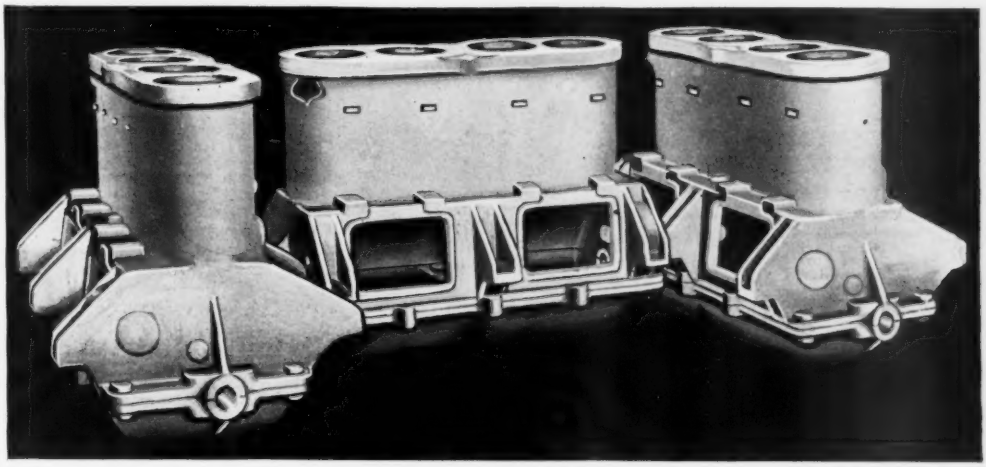
"Mr. Longmuir refers to the Eggerts test for carbon only taking fifteen minutes, but in what iron foundry doing general work can the time be found for taking, cooling, drilling, and testing the iron from each ladle before pouring? Which would be the case if anything like accuracy in the results is to be had, because no two ladles can be exactly alike from an ordinary cupola, even with the most careful charging. Bad cupola work, of course, makes the matter even worse. I take it that unless your chemist is a good engineer and well up in practical foundry management, he will not be able to remedy bad cupola work; and even then he cannot alter the matter unless he is actually the manager of the foundry.

"The gist of the whole matter simply consists in having good men, good materials, and no insane idea that you can 'lick creation' in cutting prices, because while turning out good work you want a fair price, or something will go wrong somewhere. You will not make castings from Bessemer hematite at a profit at the price a firm offered to supply engine cylinders in London—£7 10s. per ton delivered, —whether you be a chemist or not; and all the analysis in the world will not convert rubbish into good material, but the chemist may show you how to make it pass as such.

"Finally, if you use good material and employ good men in your foundry at a fair wage, you will not want fluxes or 'fakes' of any kind."

Some English Aluminum Castings.

Wm. Mills & Co., of the Atlas Works, Sunderland, England, make a specialty of turning out castings from aluminum alloys. Among these are the castings shown in the illustration which are an engine and cylinder casing for a four cylinder motor. The three views shown give an idea as to the design of the castings,



SOME ENGLISH ALUMINUM CASTINGS.

the top part of which is three feet, eleven and one-half inches long by two feet, three inches high, and two feet, three inches in width. Its weight is 275 pounds. The lower part is ten inches deep and weighs 65 pounds.

The makers say that although these castings vary in thickness from five-sixteenths of an inch to two inches they have been able to make them without excessive shrinkage or other defects from an aluminum alloy which weighs 1.62 ounces per cubic inch. Quite a success has attended this concern in the making of other castings of a complicated character. Test bars cast from aluminum by this company have shown a tensile strength of as high as 40,000 pounds per square inch.

Boston is the Place.

The announcement has just been made by Richard Moldenke, secretary of the American Foundrymen's Association, that the 1902 convention of that body will be held in Boston, Mass., June 17, 18 and 19. It is understood that the foundrymen of the New England states are making special preparations to welcome their co-workers from other parts of the country. Further particulars of this meeting will be given in later issues.

Mounting Patterns.

Mounting patterns on a stripping plate machine is at the best a tedious and often an expensive operation. The preparation of the pattern, consisting of backing it with ⅜ inch to form a guide to locate the pattern by in the stripping plate; the making of the stripping plate itself, and, in many cases, necessary stools for securing a clean lift, are some of the numerous points we have to contend with.

The use of the stripping plate machine in jobbing foundries, where orders come in for from one hundred upwards of the same pattern, and where the patterns supplied have to be worked, forms the subject of the present article; taking, for example, a gear Fig. 1, which is a casting made in many foundries, mounting it on the machine, making one hundred or more castings, and leaving a larger profit than when made by hand—including, of course, the initial cost of fixing the pattern. To do this, various methods have to be employed which would not work well where thousands were required instead of tens.

Figs. 2 and 3 are views of the pattern and plate. Instead of backing ⅜ inch completely around the gear, four pieces, each the size of a single tooth and ⅜ inch thick, are fastened on and filed level to the face of the tooth, as *A* in Figs. 2 and 3. Four studs secure the wheel to the plate and adjust it to the exact height required from the stripping plate. The size of the gear shown is 11 inches diameter and 1½ inches deep, and the machine on which it is mounted is 13x13 inches. For this machine we have six pairs of stripping plates, faced true

Fig. 1

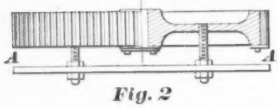


Fig. 2

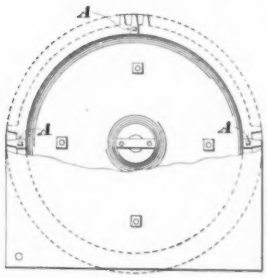


Fig. 3

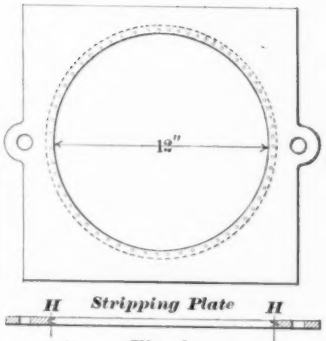


Fig. 4

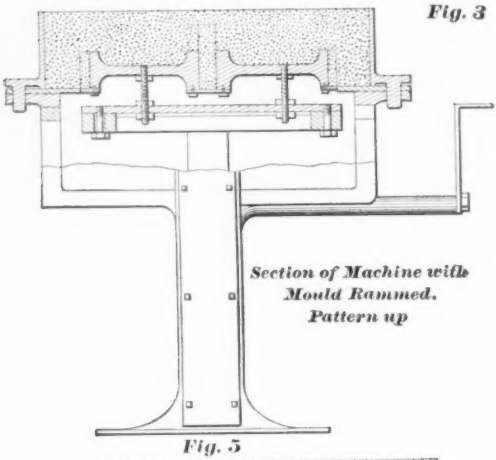


Fig. 5

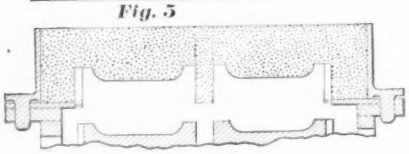


Fig. 6

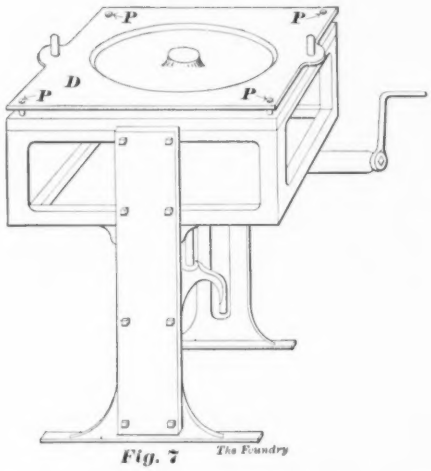


Fig. 7

and all drilled to template, with circular holes. The largest hole is 12 inches diameter, decreasing by 1 inch down to 6 inches. Fig. 4 shows a stripping plate with a groove cast in; 3/8-inch holes are drilled close to the edge of the opening into the groove. We find this arrangement works well in securing the babbitt, and when the order in hand is completed the babbitt is easily melted out.

In preparing the stripping plate it is placed face down on a level sand bed, and the gear is set into the opening in the plate and also onto the bed. Both plate and pattern having been previously warmed, the babbitt is run around into the small opening that remains. When the metal has set, the wheel is rapped out of the plate, which is then eased so that the gear works easily through the opening. We find that, with constant practice, if care is taken, very little dressing is required on the stripping plate. It is a good plan to warm the wheel and give the teeth a coat of blackwash, which about makes up for the contraction.

The pattern and plate are fixed on the machine as in Fig. 5, which shows a mold rammed ready for dropping the lever. In Fig. 6 the lever is dropped, and the pattern drawn.

The top part of the wheel is formed by lowering the lever in the machine until the top face of the wheel is level with the stripping plate. The lever is held in this position while a mold is rammed up. This is placed on the floor and a stripping plate similar to the first one described is placed on the mold. The pins in the flask and the holes in the plate make it impossible for one part of the wheel to get out of true with the other. The stripping plate is banked up ½ inch clear of the circular opening, and the white metal is poured in to leave about ½ inch of thickness on the face of the wheel. This is really a plate, as shown in Fig. 7, *D* being the plate, which is held up in the machine by being packed off the ram ¾ inch clear of the outside frame of the machine. The four screws, with counter sunk heads level

with the face of the plate P, act as supports for the flask. The sketch is shown with the lever and plate in the right position for a mold to be rammed.

When the top is rammed, the lever is dropped, which causes the plate *D* to sink down on the frame of the machine, the flask edge resting on the heads of the four screws *P*.

Referring to Fig. 5, the method of setting the core is simple and quick, and leaves the core in the exact center of the gear. The core is made 1½ inches longer than the depth of the mold, and is placed in the bored hole in the pattern and stopped by the strip of metal across the bottom face of the boss, as shown in Fig. 2; the sand is thrown in, and the mold is rammed. The rammed sand grips the end of the core, so that when the lever is turned and the mold is placed on the floor, the core is found to be perfectly set.—[George Buchanan in *American Machinist*.

Notes from Various Sources.

Joseph S. McDonald, at one time connected with Thomas Carlin's Sons Co., Allegheny, Pa., and recently connected with the Kelly & Jones Co., of Greensburg, Pa., left last week for Manchester, Eng., where he will assume charge of the brass and gray iron foundries of the British Westinghouse Co.

Pawling & Harnischfeger, of Milwaukee, have issued Bulletin No. 5, describing the variety of Hand Traveling Cranes made by them. These form but a small portion of this company's output, their chief specialty being Electric Traveling Cranes of all capacities.

L. C. Hough, manager and treasurer of the Daisy Mfg. Co., Plymouth, Mich., died recently, aged 56.

This year's calendars issued by those connected with the foundry trade show a marked tendency to reproduce typical shop scenes, such as appears on the cover of this journal, together with the color effect produced by melted iron. Among the best of these are the calendars of De Camp Bros. & Yule, St. Louis, Mo.; The Fox Hill Foundry, Hoboken, N. J.; The Acme Foundry Co., of Cleveland, Ohio, and The S. Obermayer Co., Cincinnati, Ohio.

Thos. A. Mack & Co., of Cincinnati, pig iron dealers, announce that they have opened a branch office at 601 Empire Building, Pittsburg, to be in charge of B. A. Wallingford, Jr., assisted by O. W. Mason.

The Cureton Foundry Co., of Mount Vernon, Ohio, are increasing their facilities for the prompt handling of medium and heavy castings.

Philip Hickey, of Watertown, N. Y., will have charge of the new foundry being built by the New York Air Brake Co., at Moscow, Russia.

The Standard Sand & Facing Supply Co., have secured new quarters at 32 South Water street, Cleveland, Ohio. In addition to supplies a general line of foundry machinery manufactured by them will be carried in stock.

The United States Aluminum Castings Co., of Cincinnati, Ohio, has recently been incorporated and will make a specialty of automobile parts cast from aluminum alloys. Edward Sawer is president; C. F. Root, treasurer, and Emerson Davis, general manager.

The McKenna Bros. Brass Co., of Pittsburg, intends to divide a certain share of its profits between those of its employes who remain upon the payroll continuously throughout the year. The division is to be made on the basis of the wages earned by each. A somewhat similar arrangement was followed at the close of the year by the Titusville Iron Co., of Titusville, Pa.

A. J. Hollinshead, of Hollinshead & Burton, bronze founders, Thames Ditton, England, died recently, aged 41. Mr. Hollinshead, served his apprenticeship with Mr. Cox, the former proprietor of the bronze foundry, with which he had been connected for the greater portion of the time as proprietor for a quarter of a century. He had executed some famous castings, one of his best examples being Mr. Ford's equestrian statue of the late Maharajah of Mysore.

A brass founder says that a mixture of copper 32, tin 5, lead 1 and spelter 1, makes a good strong casting of the gun metal class.

The S. Obermayer Co. have established an office at 1318 Majestic Building, Detroit, Mich., which will be under the management of E. J. Woodison.

James Oliver and the Chilled Plow.

To James Oliver, of South Bend, Ind., is due the credit for the invention of a successful chilling process. Mr. Oliver established a small foundry at South Bend in 1853, having previously worked at the trade of a molder, achieving distinction by his ability to mold difficult castings. In 1855 he began making cast iron plows in a small way, the entire output

of the shop amounting to only three heats in a week, of less than a ton each. The business grew rapidly, however, and the large demand for plows directed Mr. Oliver's attention to the problem of making a chilled mold board. For years his efforts and experiments proved unsuccessful, as had been the attempts of scores of inventors before him; but he succeeded in chilling a narrow strip at the rear end of the mold board, where the abrasive action of the soil was greatest.

Finally, however, after years of study and experiments, Mr. Oliver hit upon the idea of using a hot water chill. "This," quoting Mr. Oliver's description of the invention, "consisted of a hollow, oblong piece of cast metal, conforming to the shape of the mold board wanted, the convex surface constituting the chill proper, and the hollow or concave portion being used for a deposit of hot water, which was put in shortly before the cast took place. The hot water served the double purpose of warming the chill and drying out the under side, which naturally became damp from the moist sand just below it. The gas from the molten metal and the steam from the moist sand presented another difficulty in the way of obtaining perfect castings. This was overcome by cutting fine lines of sufficient depth on the face of the chill, which permitted the gas and steam to escape, and allowed the molten metal to come pat against the chill, insuring a perfect casting, absolutely free from soft spots, blow holes or other imperfections. To avoid the too rapid cooling of the mold boards, and consequent warping and cracking, it was found necessary to remove the mold boards from the molds as soon after pouring as possible, and place them on a bed of charcoal or hot sand. A system of sand pits was finally evolved, and sand was and is used, so that quite a number of mold boards can be put into one pit and allowed to cool slowly. This treatment prevents warping and cracking, and to a certain extent anneals, and thereby strengthens the mold board."

Of the fame and fortune that Mr. Oliver won by his invention it is perhaps unnecessary to speak, but a curious contrast might be pointed out between his life and that of Jethro Wood. Mr. Wood attempted to acquire wealth by the sale of rights and the collection of royalties under his patent, and was rewarded by disappointment and poverty. Mr. Oliver, on the other hand, looked upon his invention and his patent rights as simply a means of building up his business as a manufacturer, applying his shrewd and aggressive ability as a business man and his ingenuity as an inventor to give the farmers of the world the practical advantages of his great invention. While the theoretical dreamers of the past are forgotten by an ungrateful people, Mr. Oliver, the practical benefactor of agriculture, has won fame in every nation where plows are used, and his energy and genius have contributed in no small degree to the reputation of American inventions and manufactures throughout the world. [—R. L. Ardrey, in *Iron Age*.

Wm. Hamilton, the founder of the Wm. Hamilton Mfg. Co., Peterboro, Ont., died recently, aged 79. He was born in Swinton, Berwickshire, Scotland, and in 1844 he came to Canada, and worked in Cobourg and Hamilton in the machine trade. Then he left for the states and after short stops in several places he went, in 1850, to Shelbyville, Ind., and established a foundry and machine shop. In 1856 he left there and came to Peterboro and founded the works which bear his name.

W. H. Kane, who for the past seven years has been identified with the Dayton Malleable Iron Co., of Dayton, Ohio, has severed his connection with that concern to become superintendent of the new malleable iron foundry of the McCormick Harvesting Machine Co., Chicago, Ill.

When the Louis Lipp Co., of Cincinnati, moves into its new factory near Chester Park it will establish a new iron foundry on the property at Fifth and Wayne streets that will be vacated. The new foundry will be a general jobbing foundry, and will be operated by a corporation entirely distinct from the Louis Lipp Co., though the same interests will largely be in both. The company now does its own foundry work in connection with the manufacture of bath tubs, but when the new plant is finished this sort of work will all be done in the new plant, and the old location will be turned over to heavy castings entirely. There will be another new cupola added, and the capacity will be largely increased. The name of the new company will probably be the American Foundry Co., and it will be ready for operation about April 1, at which time it is expected that the new factory will be running.

Another Cupola Damaged by Fire.

The cupola of the foundry of Ewald Over was damaged to the extent of $10 by a blaze about 6 o'clock last night.[—*Indianapolis Sentinel.*